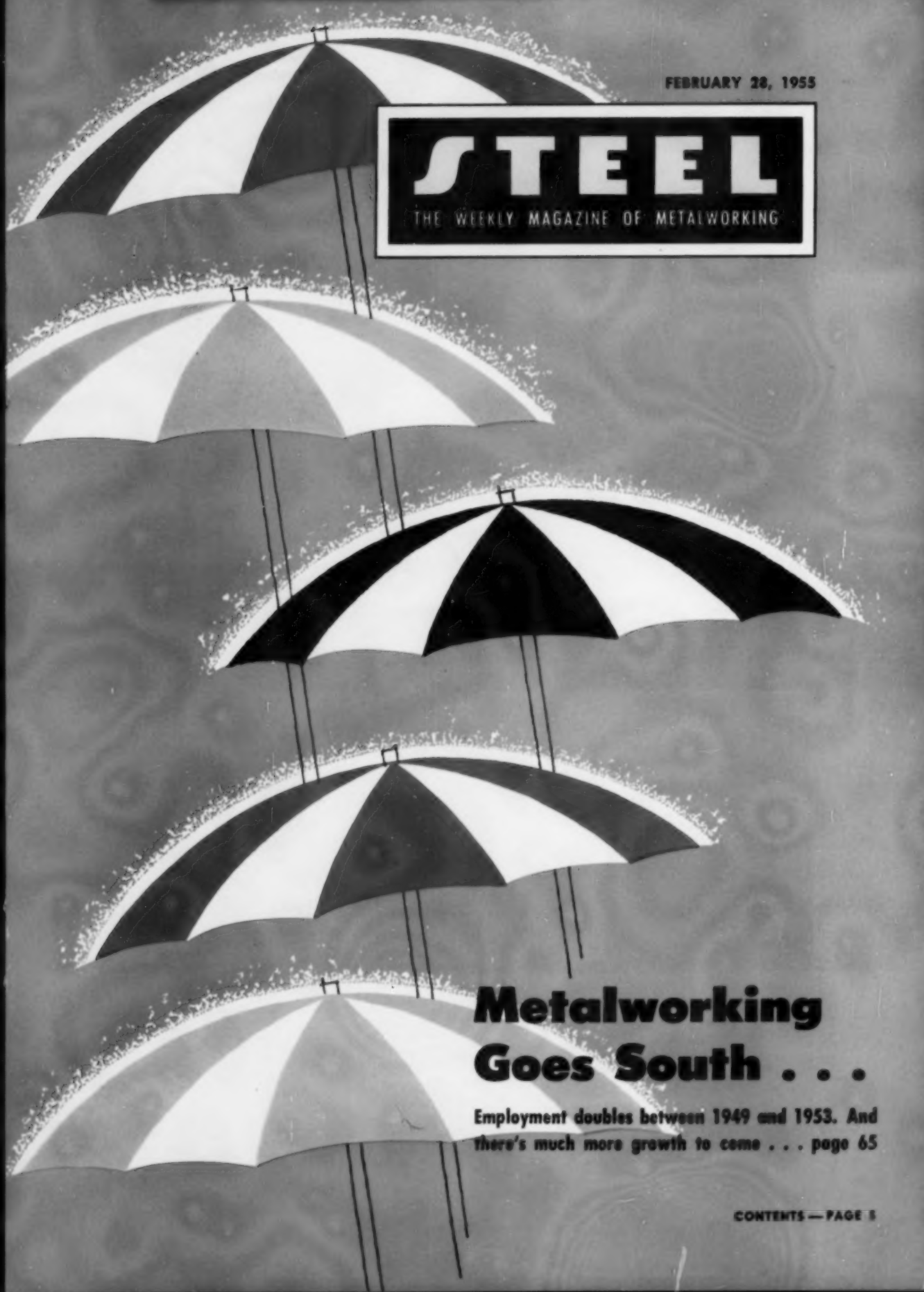
FEBRUARY 28, 1955

STEEL

THE WEEKLY MAGAZINE OF METALWORKING



Metalworking Goes South . . .

Employment doubles between 1949 and 1953. And there's much more growth to come . . . page 65

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Aetna-Standard designers and builders of production machinery

Flat Rolled Equipment

AT FAIRLESS WORKS...

● In flat rolled finishing equipment, Aetna-Standard engineered and built the following equipment:

- 80" Sheet Side Trimming, Slitting and Recoiling.
- 80" Sheet Side Trimming and Shearing.
- 56" Wide Side Trimming and Shearing.
- Sheet Stretcher Leveller.

For the Tin Mill Division, Aetna furnished a complete Hot Dip Tinning House with all auxiliaries; a side trimming and shearing line; a side trimming and recoiling line; and the classifying equipment for the electrolytic tinning line.

THE AETNA-STANDARD ENGINEERING COMPANY • PITTSBURGH, PA.

Aetna-Standard

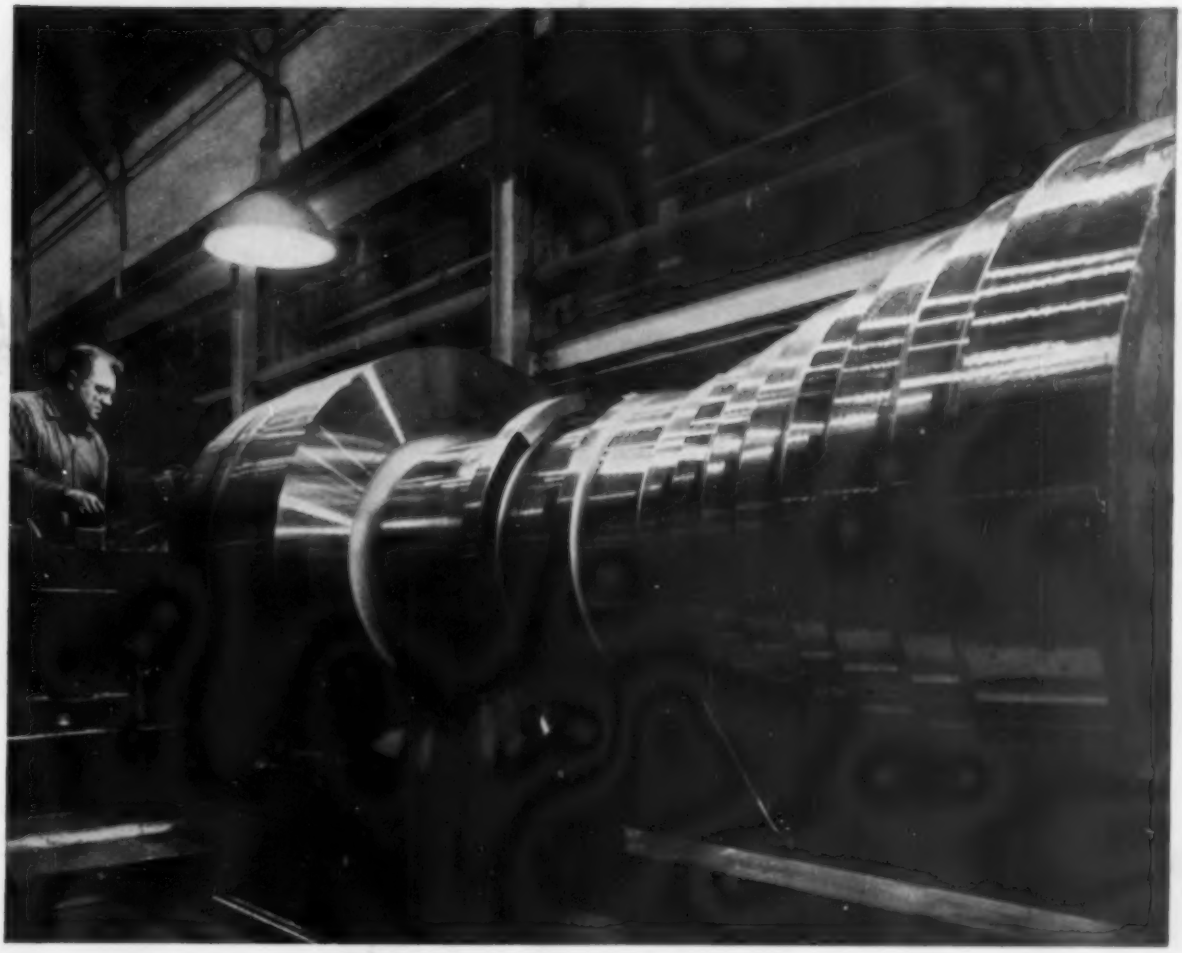
PLANTS IN WARREN, OHIO • ELLWOOD CITY, PENNSYLVANIA

GOOD EQUIPMENT BRINGS DOWN PRODUCTION COSTS

SUBSIDIARY and ASSOCIATED COMPANIES

Head Wrightson Machine Company, Ltd., Middlesbrough, England — Great Britain, Finland, Sweden, Norway, Denmark, Union of South Africa, Northern and Southern Rhodesia.
Aetna-Standard Engineering Company, Ltd., Toronto, Ontario, Canada.
M. Castelvi, Inc., New York, N. Y. — Mexico, Central and South America.
Societe de Constructions de Montbard, Paris, France — France, Belgium, Holland, Luxembourg, Switzerland.
Demag Aktiengesellschaft, Duisburg, Germany — Germany, Austria, Yugoslavia, Greece, Turkey, Egypt.
Compagnia Italiana Forme Acciaio, Milano, Italy — Italy.
Aetna-Japan Company, Ltd., Tokyo, Japan — Japan.
Kale & Euligren, Inc., Akron, Ohio — Representative for the Rubber Industry.
Standard Engineering Company, Ellwood City, Pa.
Trans-World Traders, Pittsburgh, Pa.

Designers and Builders to the Ferrous, Non-Ferrous, Leather, Rubber, and Plastic Industries



21-Ton Forging Becomes Spindle for Steam Turbine

This big forging, made of chromium-molybdenum-vanadium steel, weighs approximately 43,000 lb—over 21 tons. It was upset and solid-forged from an ingot, then rough-turned, block-bit-bored, and heat-indicated for stability. At the machining stage shown here, the forging is 18 ft 8½ in. long and has various diameters ranging from 14⅛ to 52⅞ in.

It is in the process of becoming a spindle for a large steam turbine—one of many such pieces that Bethlehem has made through the years. You could call it a typical example of Bethlehem heavy forgings, though it by no means represents the top limits of our shop capacity. Some of our giant-size forgings have exceeded 100 tons with plenty to spare.

Down at the other end of the line, we make drop forgings weighing as little as one pound. And in between the two extremes you will find about every size, type, and weight of forging that is ever called for—including some unusual items that might never occur to you. Example: tapered-end forged-and-bored pieces for high-temperature, high-pressure service in central stations and oil refineries.

No matter what kind of forgings you require—large, medium, or small—Bethlehem can make them for you. Call us when you're in the market! A job done in the Bethlehem shops is one you can depend upon.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

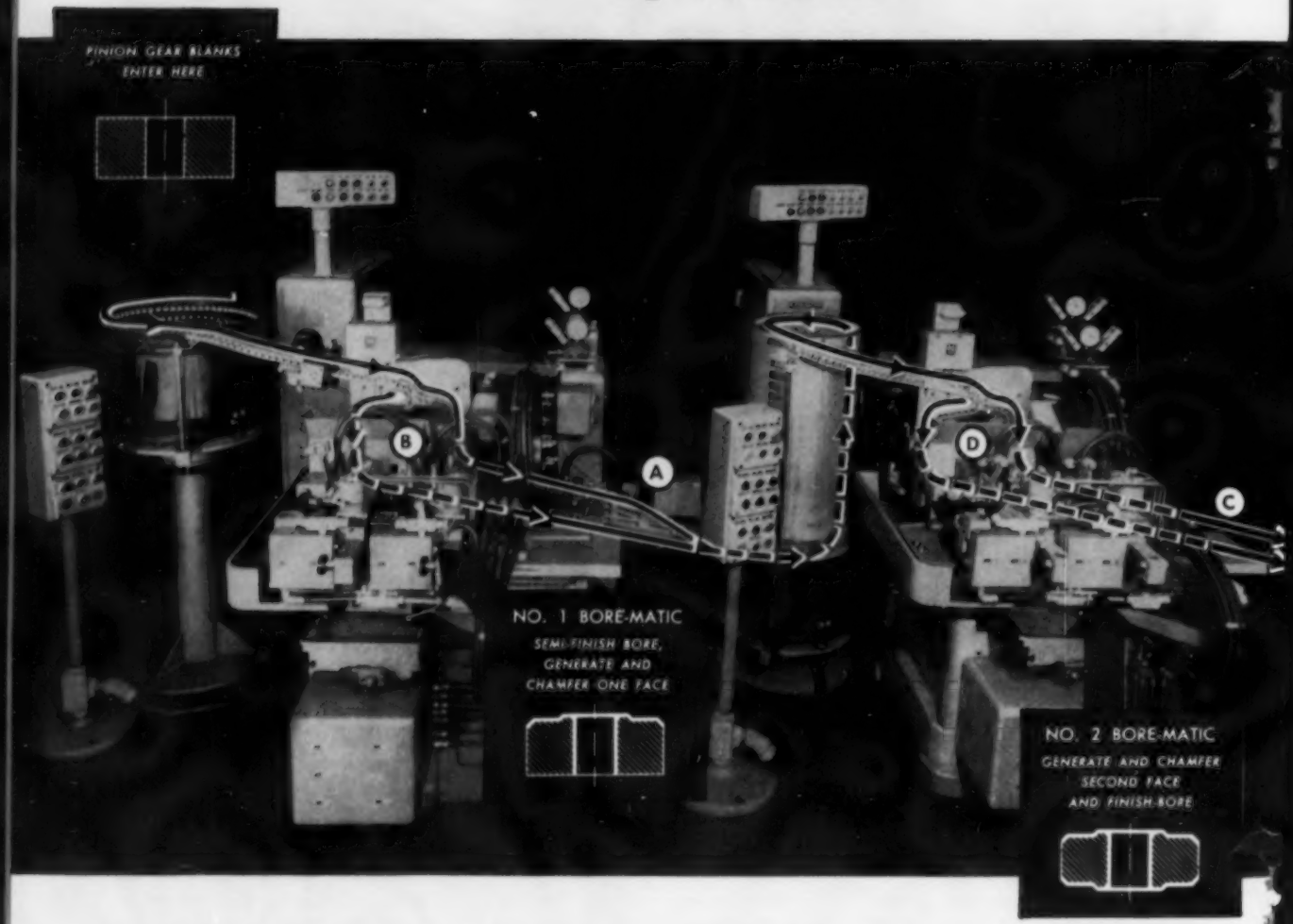
BETHLEHEM STEEL

BETHLEHEM STEEL

gear-blank Borizing

COMPLETELY AUTOMATED

by HEALD



THIS HEALD automated Bore-Matic installation performs every operation completely automatically — including work holding, inspection, loading, borizing, ejection, gaging, sorting and tool setting. Here's how it works.

Parts are fed from a vibrating hopper into the loading chute of Bore-Matic No. 1, where they are inspected by a "go-no-go" gage, loaded into chucks and borized two at a time to semi finish the bore and generate and chamfer the outer face. They are then fed to the gaging station at "A" where parts are simultaneously air-gaged for bore size. Gaging data from this point is fed back to the boringheads "B", automatically advancing the tool if bore is undersize or retracting it if bore is oversize. The correctly sized parts then go to the second vibrating loader for No. 2 machine, where they are faced and chamfered on the second side and finish-bored, two at a time. At sorting and gaging station "C" they are again air gaged and boring tools at "D" automatically adjusted to correct for bore size if necessary.

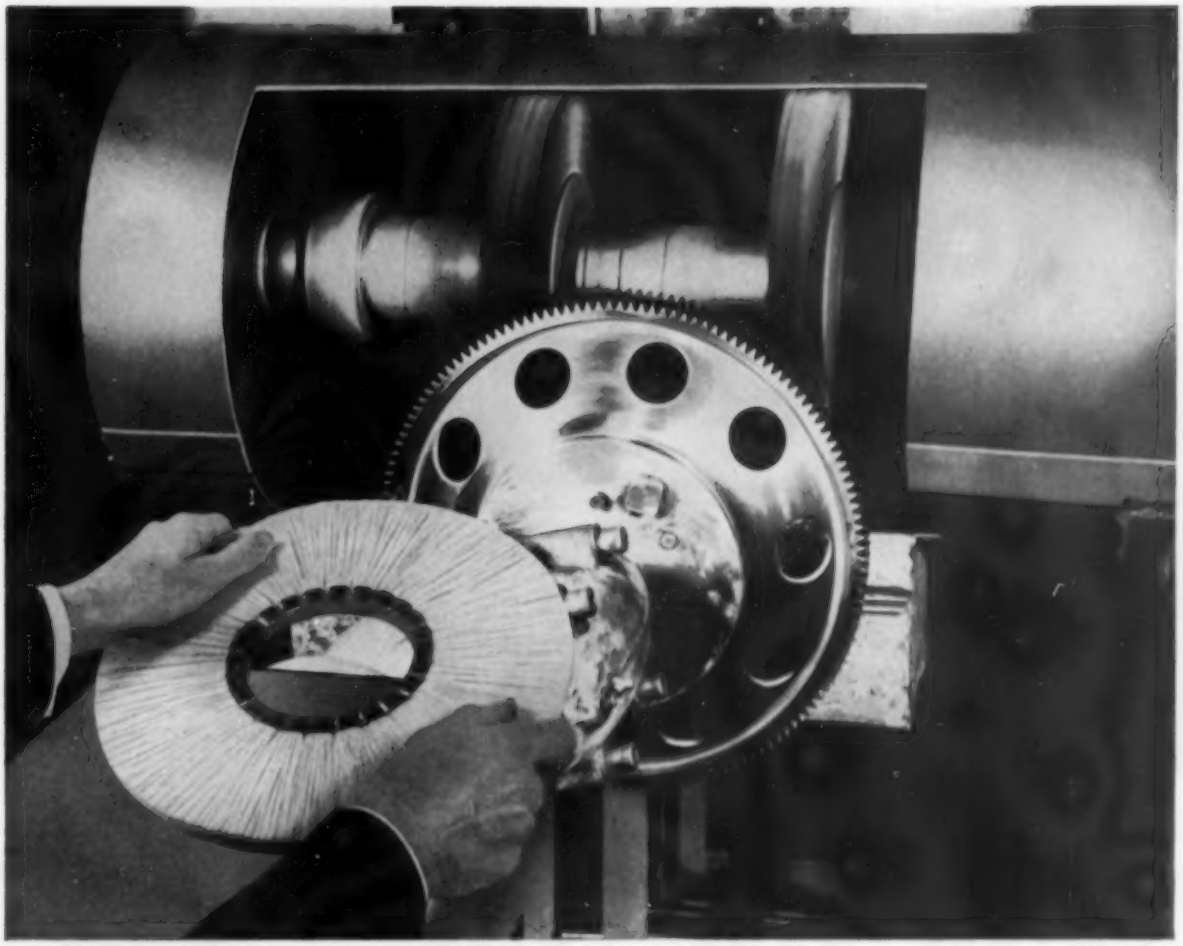
This installation shows how Heald engineering and equipment fit into the modern automated production line. But no matter how much or how little automation you need .... **It pays to come to Heald!**

HEALD®

THE HEALD MACHINE COMPANY

WORCESTER 6, MASSACHUSETTS

Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York



Push-button brushing beats handwork 15 to 2

PRODUCTION EFFICIENCY IS HIGHER. *Now it's easier to produce uniform finishes on many types of gears. Setup is simple . . . operations are done on preset time cycles to cut manufacturing costs.*

What manual operations could an OBA eliminate for you?

7½ times as fast. Here, Osborn Fascut® Brushes are removing burrs and blending surface junctures on spur gears. Each gear has two internal and two external gear sides that must be finished. Rate . . . 15 gears or 60 gear sides per hour. Former rate with manual method was at best two gears an hour.

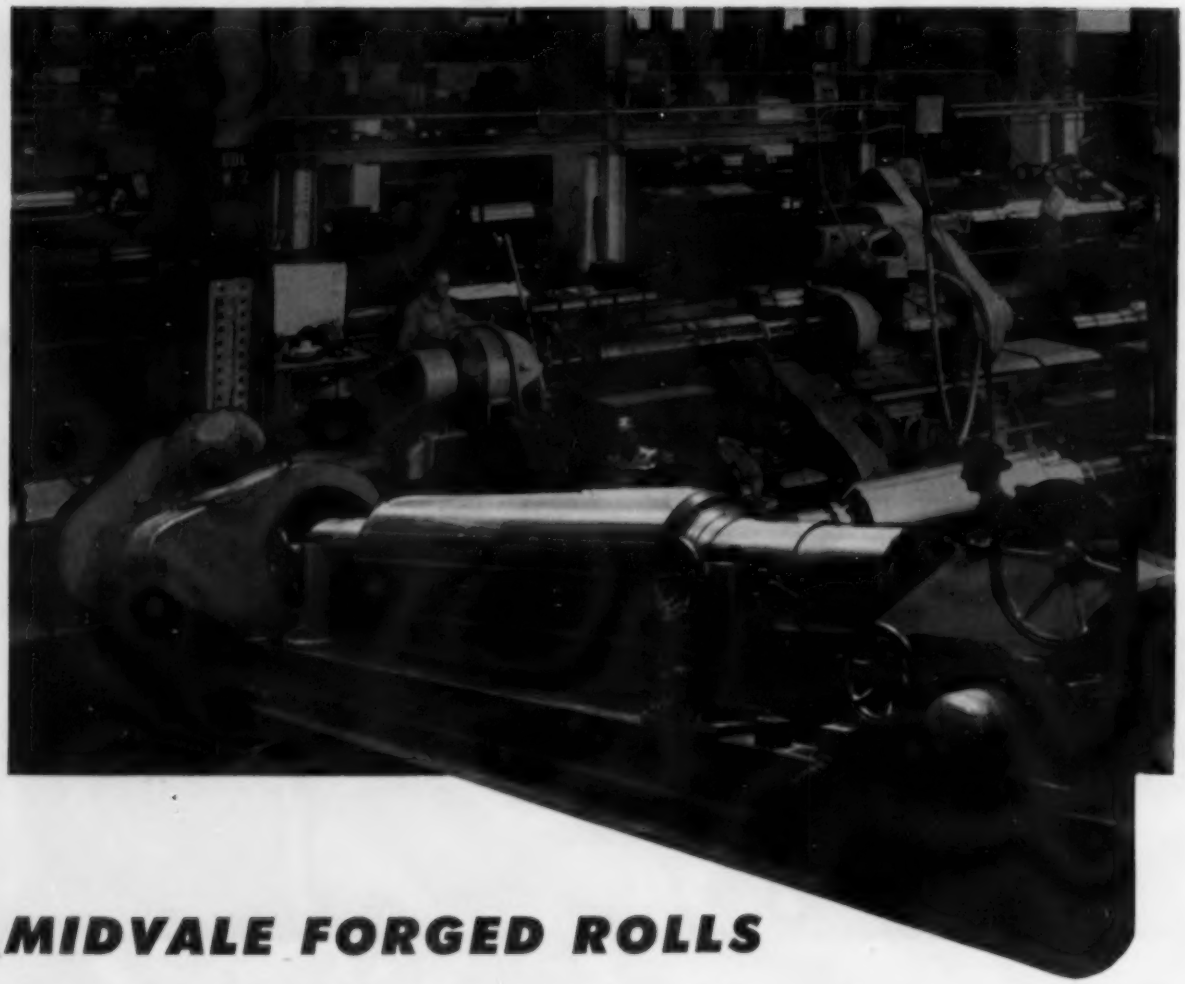
Scrap has been virtually eliminated by Osborn's Power Brushing method. That's because surface quality of gears is more uniform. Stress concentrations have been eliminated by the surface juncture blending of gear teeth.

An **O**sborn **B**rushing **A**nalysis can show you how to improve your operations through power brushing and benefit with savings like these on your cleaning, finishing and burr removal jobs. Call or write *The Osborn Manufacturing Company, Dept. G-29, 5401 Hamilton Ave., Cleveland 14, Ohio.*

Osborn Brushes

OSBORN

BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES



MIDVALE FORGED ROLLS

TOUGH ROLLS TO BEAT AT THE FINISH

From the furnace to finished grind Midvale Forged Steel Rolls are made with greater durability to provide a finer finish for longer runs.

Half a century of roll making experience skillfully shapes rolls under the right size press for the particular roll . . . produces the maximum in grain refinement. Careful heat treatment gives them the required surface hardness, up to 105 Shore, and endurance qualities underneath.

A series of inspections, including sonic testing, approve it for service.

Do you need high quality, longer lasting forged rolls in your mill? Whether they are for strip or sheet mills . . . precision rolling of copper, aluminum or other metals, let Midvale roll specialists show you why you can be sure of a good finish when you start with Midvale Forged Steel Rolls.

THE MIDVALE COMPANY- Nicetown, Philadelphia 40, Pa.

Offices: New York, Chicago, Pittsburgh, Washington, Cleveland, San Francisco

MIDVALE

FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS

This Week in Metalworking

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

Vol. 136 No. 9 February 28, 1955

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Simple economics prompt many mills to adopt a "peaceful coexistence" policy with their biggest competitor

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Some 8000 companies have plans now which boost employees' annual earnings an average of 10 per cent

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As heavier demands are made on turbines, engineers look to higher temperatures, pressures for efficiency gains

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A raw metal part goes through a $100,000 tunnel system to be cleaned, painted and dried. It takes 53 minutes

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QUICK DELIVERY

The ACME organization was built to give prompt or immediate service. The flexibility of our equipment, the crew of skilled mechanics, our large inventory of standard sizes of ACME Chains, and good shipping facilities, all go to give you ACME Chains when you want them—where you want them.

By 'quick delivery' we mean shipment the same day your order is received. Delivery on 'special orders' is made a week or two sooner than you would normally expect.

Incidentally:

Special assistance from ACME Engineers is ever available to you. At no obligation, our chain experts will gladly cooperate with your designers on your projects.

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Write

Dept. 10-R for new illustrated 76 page catalog on use and application of roller chains and sprockets.

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HOLYOKE MASSACHUSETTS

For stress, wear or vibration a

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will hold tighter, wear longer, cost less!

The Gripco Lock Nut, with its simple, one-piece design, has given industry a tighter, more positive holding action for quicker fastener application at less initial cost. It provides frictional resistance to vibration and loosening torque — is faster to use — permits repeated removal and reapplication—simplifies production—lowers manufacturing and maintenance costs — has improved the durability of hundreds of products—and has insured greater customer satisfaction. If stress, wear or vibration is your problem, specify Gripco Lock Nuts for greater holding power. Impervious to oil or water. Write for samples and full details.

GRIPCO PRODUCTS INCLUDE:
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"after 50 years still holding strong"
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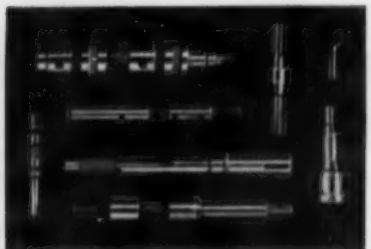


Your machining department for hardened and precision ground screw machine products. Send for brochure & equipment list.

Ottawa STEEL PRODUCTS INC.
Grand Haven Michigan

behind the scenes

Lawrence Rides Again

On Saturday afternoon, Feb. 5, television fans who had tuned in Detroit's Channel 7, WXYZ-TV fell victims to their reflexes and unconsciously leaped for safety: they found themselves in a world of speed. Hot Rods zoomed, Jalopies zipped and Sports Cars bounced in the only show of its kind on TV. Viewers who had automatically vaulted out of the way sheepishly came down from their mantels and drapes and watched and listened with great interest while a well known automobile authority, recently re-elected President of the Detroit Region, Sports Car Club of America, commented briskly.

By this time, of course, we trust we have the reader trembling with curiosity, so we will reveal at once that the well known automobile authority referred to is none other than STEEL's Detroit Editor, Mirrors-of-Motordom Floyd Lawrence. The television show that Floyd adorns is called "A World of Speed"; it features film on racing, new automobiles, new engineering developments, unusual cars, interviews with auto industry personalities and other interesting angles of the automotive industry. On his first show Floyd did a beautiful job, and while he doesn't have any illusions, he hopes that some day the show will graduate to a network production, and thus reach all readers of STEEL.

Cartoon Team Clicks

People who brag are really insufferable, but we can't help being smug over our clever associates. When you're just an ordinary slob it's refreshing to consider that you can brush elbows every day with genius. Right on the heels of the news that Floyd Lawrence is currently knocking the auto bugs dead on Detroit television, we learn that STEEL's Promotion Manager, Sal Marino, and STEEL artist Eddie Drozdz are parents of a new cartoon feature in PRINTER'S INK. Sal created a thing called "Sales Menagerie"; it gently ribs types of space salesmen and classifies them as Cocky Doodle, Ditto Duck, the Joyeux Jackass, etc. After Marino dreams up the character and writes the caption, Drozdz fishes about in the remote fastness of his cerebrum and produces pictures of things never before seen on earth. Through the courtesy of PRINTERS' INK we reproduce here the Marino-Drozdz version of the Joyeux Jackass:

A Joyeux Jackass, sometimes called Happy Jack for short, is well known to us all. He's the type of sales personality who lives in a perpetual dream world. He sells primarily on personality, generously sprinkled with a la carte dinners, tickets to the World Series and weekends at the country club. Rumor has it that this breed of salesman will become more rare in 1955-56. New selling climate will not agree with him.

Old Spikes For Sale

You'll notice by our mast head that we have all sorts of editors: assistant editors, associate editors, managing editors, market editors and so fourth; we even have a copy editor. Last week, however, a letter came addressed to an editor so far unclassified by the publishers: Old Products Editor.

The letter came from Mrs. Everyl Gore, a lady who walked the ties between Tonopah and Goldfield collecting rusty railroad spikes. When she had gathered enough to ballast a truck she offered them for sale, so if you find that you simply can't go on without a rusty old spike reeking with history, communicate with Everyl at P. O. Box 2113 Santa Fe, N. Mex., flash $2.95, and say that Shrdlu sent you.

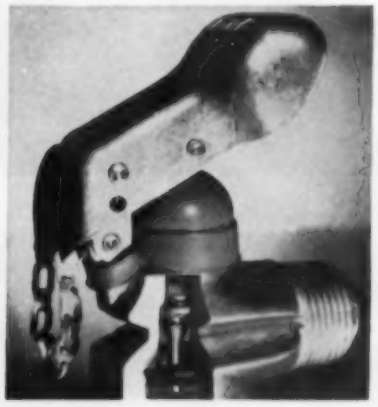
Shrdlu

(Metalworking Outlook—Page 49)

Here's why Ansul extinguishers give you faster, more dependable fire protection!

READY for instant action under the most severe exposure conditions.

WEATHER-TIGHT NOZZLES made of aluminum and stainless steel, can't rust. Neoprene cap and oil-impregnated washers keep out moisture.



PUNCTURE PIN. In this aluminum housing a stainless steel pin pierces the gas cylinder that supplies the propellent power for the dry chemical.

PATENTED NOZZLES. Straight or fan stream, the hazard determines which is installed. An Ansul exclusive for more effective fire control.

FIELD RECHARGING. Just 4 minutes after a fire is extinguished your Ansul unit can be recharged, ready for action. No special tools are needed.

The pictures on this page tell half a story. The complete story includes Ansul's facilities for training your personnel in the science of fire control and prevention. Experience has taught us that *complete* fire protection demands *both*—fast, dependable equipment and trained personnel to man that equipment. Ansul can provide both. Get in touch with your local Ansul man, he has the complete story about *complete* fire protection.

Call the ANSUL MAN!

Get in touch with your local Ansul man through the "yellow pages," or write direct to ANSUL CHEMICAL COMPANY, Fire Equipment Division, Dept. F-131, Marinette, Wisconsin.

Write Ansul for your copy of New Fire Equipment Catalog.

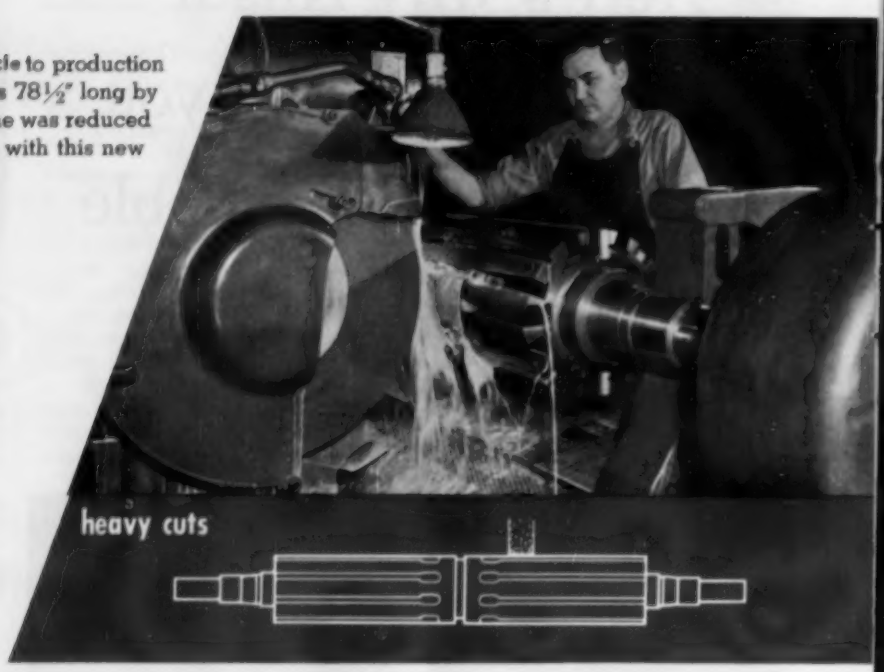
ANSUL

You Can Get Results Like These

from modern Landis

heavy cuts

Interrupted cut no obstacle to production of these slotted cylinders 78½" long by 13⅝" O.D. Grinding time was reduced from 7 hours to 6 hours with this new Landis grinder.



LANDIS 24" x 120" type FR Roll Grinder
Detailed specifications in Catalog F-48.
Send for your copy today.

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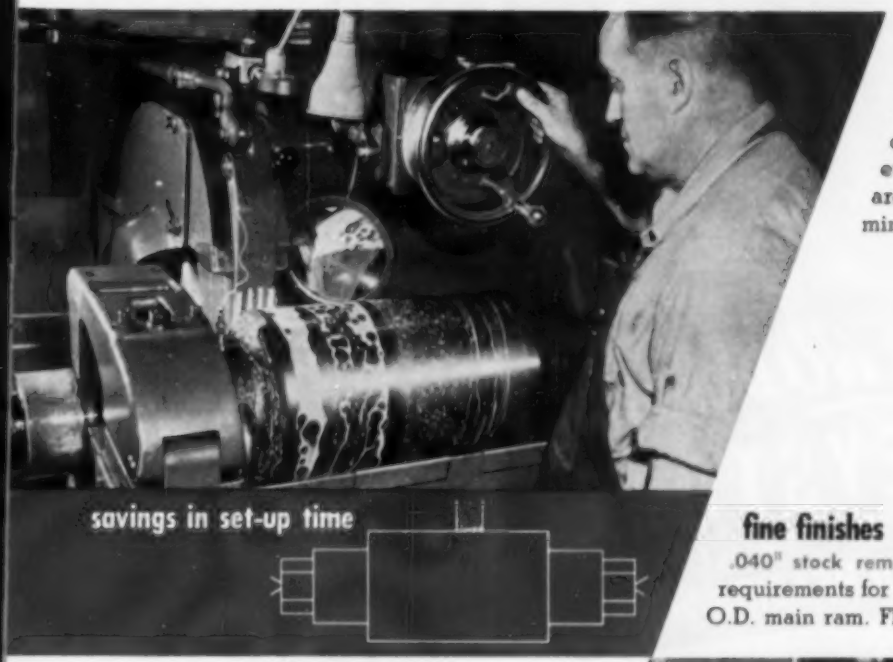
precision grinders

type FR Roll Grinders . . .



savings in set-up time

Regrinding roll for cold rolling operations. Patented crowning mechanism insures exact duplication of crowning setting on every job. Rolls have 20" face and are 12" O.D. Grinding time is 20 minutes floor-to-floor.

fine finishes

.040" stock removal to 6 micro inch finish are requirements for grinding this 32⅝" long by 13" O.D. main ram. Floor-to-floor time is 4 hours.

150

LANDIS TOOL COMPANY / WAYNESBORO, PENNA., U. S. A.

Forming the above Special Pan Head Bolt in two blows presented a difficult cold heading problem that was solved by the use of Keystone "Special Processed" Cold Heading Wire.

The superior grain flow characteristics of "Special Processed" Wire provided the necessary upsetting and die forming qualities to withstand the terrific displacement of metal during the two blow process. The head was formed without buckling, distortion or cracking — longer die life, increased production, and a higher quality finished product resulted.

Carefully selected ingredients — our own exclusive drawing and heat treating process — rigid quality controls and inspections — give this wire unsurpassed performance on any unusually difficult cold heading job. Your inquiry is welcomed.

LETTERS
TO THE EDITORS

Work Tool for Management

I have enjoyed STEEL's 1954 Program for Management, and I would like to have a complete set of the articles. I tried to retain all the copies, but some slipped away.

I have clipped most of the articles in the series and have them filed in my personal reference book. We go through the articles every so often to refresh our memory of the things we wish to accomplish.

If you have any copies of the following articles in the 1954 series, however, I would appreciate replacements:

No. 1: How You Have To Sell
No. 2: Build Better Bosses
No. 3: Automation—How Far Should You Go?
No. 9: The Foreman — Make Them Managers

J. A. Dean
manager
Nemco Foundry
Division of Nelson Electric Mfg. Co.
Tulsa, Okla.

. . . I found STEEL's 1954 Program for Management series stimulating in thought and action.

Norman W. Scherer
Klotz Machine Co.
Sandusky, O.

Chaos in Copper

Please reprint and send to my attention 1000 copies of the "Nonferrous Metals" column of the Feb. 7 issue, p. 172. . . I think that the article on copper is an excellent exposition of the existing chaotic situation in the market today, and you are to be complimented on your grasp of the situation.

E. I. Rimbault
Federated Metals Division
American Smelting & Refining Co.
New York

• *Being sent.—ED.*

Brief Course in Steelmaking

Will you please give me some information on the statistics covering the steel industry. Each week you publish the percentage of steel operations together with the total tonnage expressed in ingots. I understand all this clearly, but the term "castings" frequently enters the

(Please turn to page 12)

The Falk Corp., of Milwaukee, also uses Elastic Stop nuts in the tie rod assembly . . . and on the gear housing to maintain tight cover fit.

Elastic Stop® nuts solve critical gear adjustment problem in new speed-reducing unit!

In its rugged new Shaft-Mounted Drive, The Falk Corporation uses a self-locking Elastic Stop nut to secure the high-speed gear to the intermediate shaft, as shown in the illustration on the left.

The precision-made Elastic Stop nut stays firmly in place and the close seat-squareness tolerances maintain the exact original gear adjustment withstanding severe vibration caused by shock loads transmitted through the gears. Costs are cut because drilled bolt holes and cotter pins are eliminated.

Here's how this Elastic Stop nut works: The familiar red collar of the Elastic Stop nut is deliberately undersized in relation to the shaft (or bolt) diameter. It grips the shaft with a perfect fit, enforces a continuing self-locking pressure against the metal threads, and holds the nut securely in place at the desired point on the shaft. This same tight-fitting locking collar also provides a seal that prevents oil from seeping along the bolt threads, wherever oil seepage is a problem. And because the bolt threads are protected against moisture from without, the nuts cannot become "frozen" to the bolt by corrosion. The elastic recovery of the red collar permits extended re-use of Elastic Stop nuts.

Mail the coupon for information on how Elastic Stop nuts can solve your specific fastening problem.

ELASTIC STOP NUT CORPORATION OF AMERICA

ESNA® ROLLPIN TRADEMARK

Elastic Stop Nut Corporation of America
Dept. N67-260, 2330 Vauxhall Road, Union, N. J.
Please send the following free fastening information:

☐ ELASTIC STOP nut bulletin

☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name _____ Title _____

Firm _____

Street _____

City _____ Zone _____ State _____

...for the best solution to your bearing problem

For quick replacement wherever and whenever a finished, ready-for-assembly highest quality bronze bearing is required, simply phone your local Bunting Distributor. Even extra ordinary requirements can be met from the vast assortment of finished Bunting bronze bearings in his comprehensive stocks.

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Your Bunting Distributor carries in stock for your money saving convenience completely machined and finished Bunting Standard Stock Industrial Bearings, Electric Motor Bearings and Precision Bronze Bars in a complete range of sizes, meeting all your usual production and maintenance needs. You will find him listed in the classified section of your telephone book—most likely under the heading Bars, Bronze or Bearings, Bronze. Your Bunting Distributor is an industrial distributor or a specialist in certain industrial items. He has been especially selected for his responsibility and his understanding of bearing requirements. Ask him for the Bunting Catalog or write.

Bunting®

THE BUNTING BRASS & BRONZE COMPANY, TOLEDO 1, OHIO
BRANCHES IN PRINCIPAL CITIES

LETTERS

(Concluded from page 10)

picture in terms of tons produced. Do you call casting production and ingot production the same?

Another statistic which is never mentioned is the scrap tonnage used to produce each week's ingot production.

Is pig iron included in the ingot production?

I am curious to know how much pig iron is produced along with ingot production and how much new ore is used with how much scrap. This would tell your readers how much actual new-mined ore and how much scrap is required to maintain the industry at any given level.

Mac Irwin
president
Quincy Compressor Co.
Quincy, Ill.

• *The terms "castings" and "ingots" in reports on steelmaking rates are two separate things. Steel coming from the steelmaking furnaces goes either into ingots for further processing or into castings. Most of the tonnage goes into ingots. For example, in 1953, of a total steel production of 111,609,719 tons of raw steel, 111,326,164 tons were poured into ingots and 283,555 tons were used to make steel castings. Weekly figures are collected for steel ingot production, but statistics on pig iron output and consumption of iron ore and steelmaking scrap are collected monthly. The percentages of pig iron and scrap used will vary according to economics of the situation. When scrap prices are high, the mills will reduce the amount of scrap used and raise the amount of pig iron. While you might arrive at a rough figure as to how much iron ore and how much scrap are required for a given rate of steel production, it would be only an approximation.—ED.*

A Slip of the Fact

We would like to call your attention to a typographical error in the photo caption in the Feb. 7 issue, p. 122, "Adds Needed Squeeze," describing the Birdsboro Steel armor plate leveler.

The unit will straighten heat-treated, cold armor plate up to 2 in. thick by 200 in. wide rather than thicknesses up to 2 ft as stated in the caption.

B. A. Kline
sales manager
Birdsboro Steel Foundry & Machine Co.
Birdsboro, Pa.

Added Word on Telegrams

Your article, "Putting Telegrams To Work for You," (Jan. 31, p. 49) was interesting and to the point. I would suggest also the idea of including in the address the telephone number of the addressee. I have found that this practice has the effect of speeding up the transmission of the telegram because it obviates the necessity of the telephone clerk at the destination looking up the telephone number required. This not only saves time for looking up numbers but the message is given priority.

M. S. Bailey
Machine Products Corp.
Rosemount, Que.

THIS PLANT HAD THE RIGHT IDEA

but not the *Right machine*

The Right Machine can make a whale of a difference. Sometimes it's the difference between showing a profit or just getting by. Often (in a machine job shop) it's the difference between getting the order or losing it.

Remember, the true cost of a machine is entirely dependent upon its output. If you don't have the right machine on your job, it may pay you to see that your competition doesn't get one first.

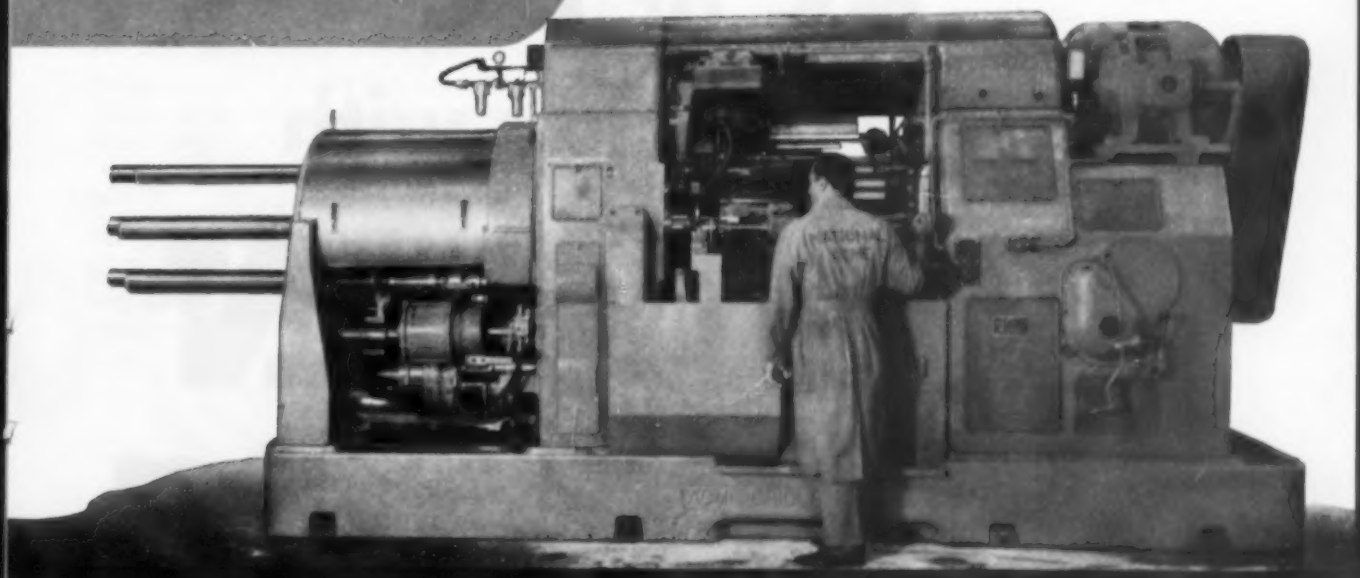
CHANGING FROM 4-SPINDLE TO 6-SPINDLE OPERATION, THIS PLANT NOW SAVES PLENTY ON *BIG PARTS*

In a large screw machine products plant, the RIGHT machine for the job was a *six-spindle* bar automatic *large enough to handle up to 6" bars.* The 4-spindle machine they were using was large enough, but they needed the extra tooling capacity that 6-spindle operation could give them.

Could National Acme solve their problem? National Acme not only could—but did. Today this plant has an ACME-GRIDLEY "BIG 6-INCH SIX"—the largest six-spindle bar automatic ever installed in a screw machine products plant.

Today they enjoy all the production benefits on large parts that six-spindle tooling is giving them on smaller ones. The "BIG 6-INCH SIX" is breezing along day after day performing all operations simultaneously, with only the time required for the longest single cut controlling output. And it's doing it with just *one machine setup.*

We'll be glad to study your operation and give you our recommendation, with no obligation to you.



Remember: You can't do **TODAY'S** job—with **YESTERDAY'S** tools—and make a profit **TOMORROW**

ACME-GRIDLEY BAR and CHUCKING AUTOMATICS
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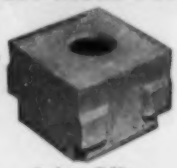

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See the following four pages for other New Britain *New's*.

New Approach to Precision Boring

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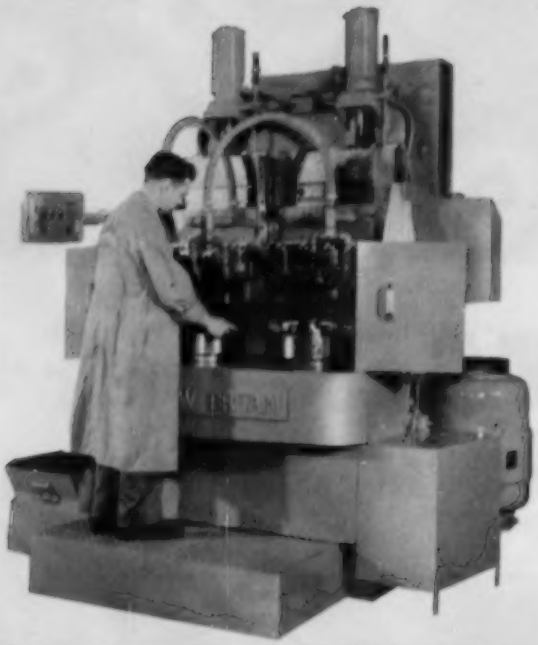
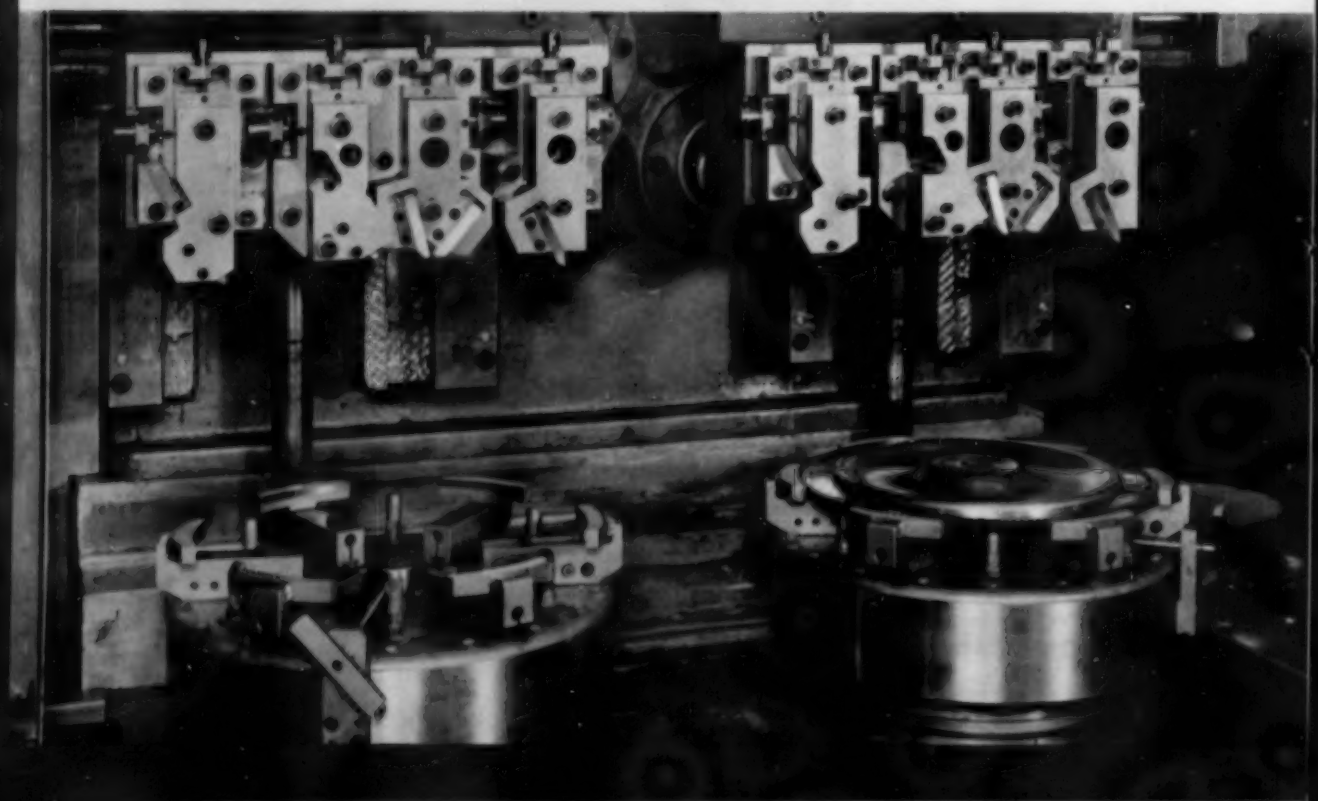


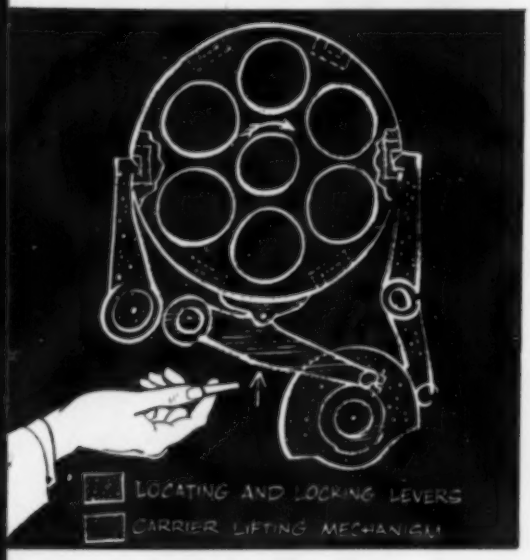
It extends the speed, accuracy and fine finish of precision straight and contour boring and turning to an even wider range of work.

New Britain's new vertical models feature accurate control of tool paths and cycle timing. This is the basic approach to precision boring employed in New Britain's famous single and double-end boring machines.

Shown below: a close-up of the tooling area of the Model 210 New Britain Vertical Precision Boring Machine at the top of the page.

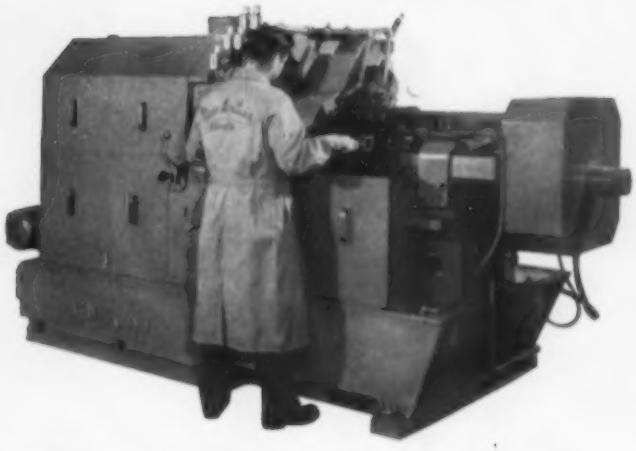
Two pieces are machined simultaneously by duplicate sets of tools. Left hand piece has been removed to show construction of chuck.





Even slight wear on the spindle carrier or its locating pads would destroy accurate alignment of end-working tools with center line of the spindle. Blackboard sketch shows how carrier is lifted during index, positively located and locked during cutting cycle.

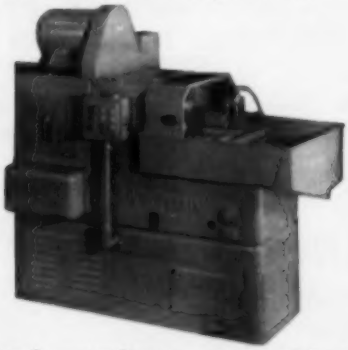
Billions of indexes with absolutely no wear!



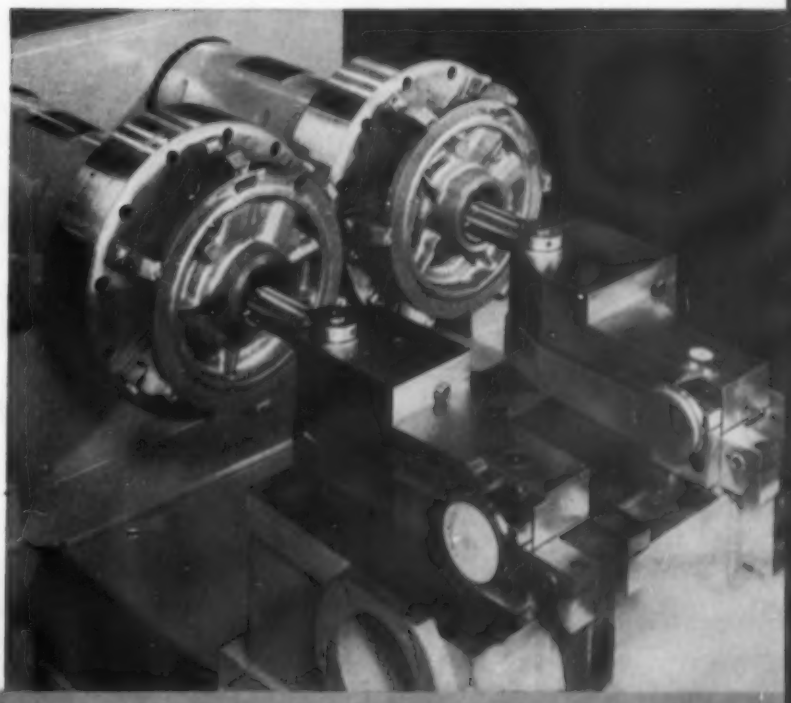
Experienced shop men say: *New Britain Chuckers stay on the job and stay accurate.* That sums up the profitable end results of exclusive features like the one described at the left.

The secret of precision boring is constant close control of the tool

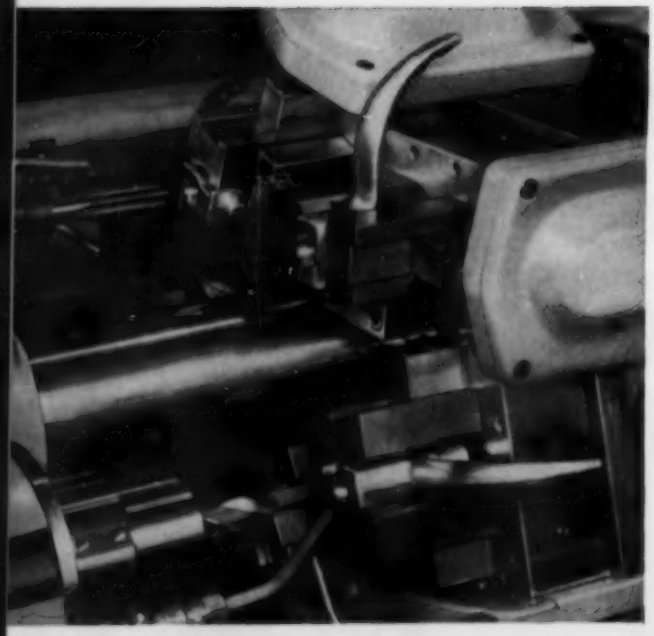
Successful precision boring and turning calls for control of tool paths and cycle timing, both with "gage makers' " accuracy. Precision ground cams insure this accuracy under all conditions on a New Britain. This hairline control, combined with ruggedness and stamina for *permanent* accuracy, produces fine finishes piece after piece, year in and year out.



See the preceding two pages and the two following for other New Britain *New's*.



New New Britain Chucker will produce pieces as fast as operator can load them.

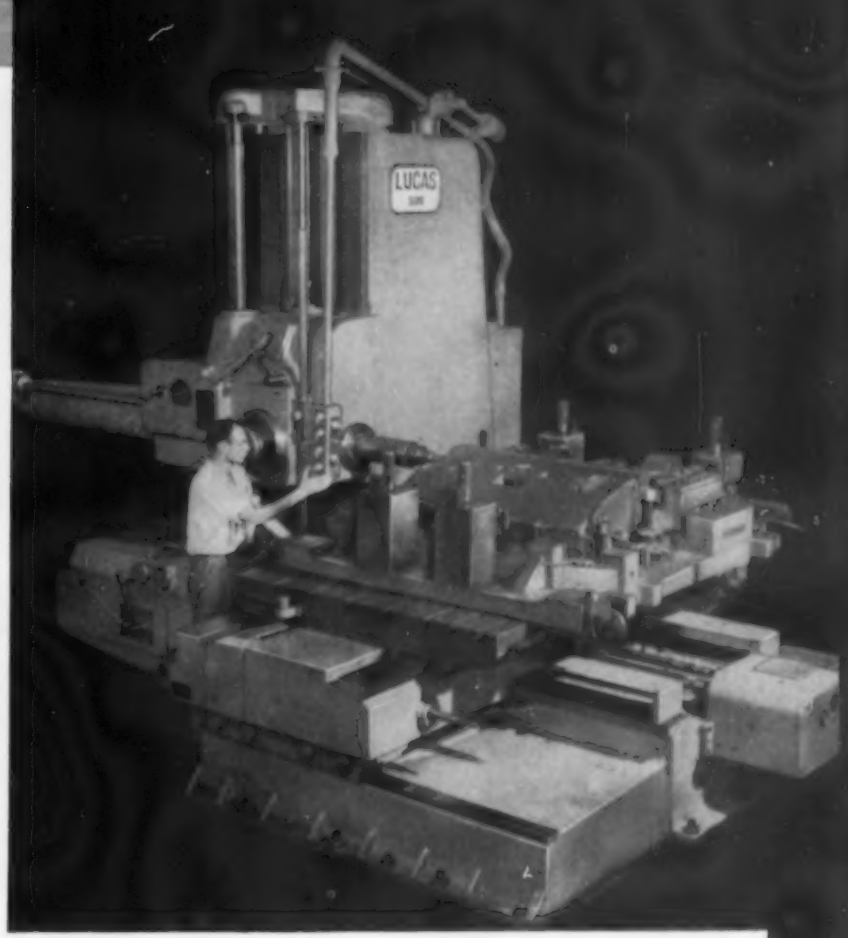


Irregularly shaped pieces — parts difficult to swing on a work-rotating chucker — pieces hard to produce at a profit, belong on the New Britain Model 23B.

This four-spindle chucker can machine up to 1290 pieces per hour (that's one every three seconds). A fifth, easily-operated, quick-acting chuck in the loading position minimizes idle time and operator fatigue.

If you produce pieces that lend themselves to a tool rotating machine, New Britain Model 23B could become one of the most valuable machines in your shop. Check with the New Britain man or write for Catalog on Model 23B.

LUCAS OF CLEVELAND



Model 6120S Lucas Precision Horizontal Boring Machine built for a large stamping plant, is used for reconditioning, altering and originating large die sections.

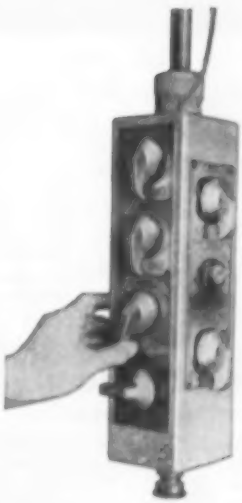
This short bed space-saving machine incorporates all the features of standard machines except a backrest for bar support. The 120" wide bed is of one piece construction for rigid table and saddle support.

This machine is ideally suited to heavy die work which combines operations of boring, drilling and milling in both high and low speeds.

This Lucas will be YEARS AHEAD for a long time

Because Lucas applies its engineering skill to boring machines exclusively — because so many of the important improvements have originated at Lucas — because every new development is incorporated in the next lot built, *you get the latest first when you buy a Lucas.*

For example: Lucas, one of the first to develop pendant controls on the Horizontal Boring Machine, now offers a new, compact, lightweight control pendant with smooth operating multi-purpose directional switch levers. Or take Lucas Automatic Power Positioning, with built-in, pre-set positioning feed which positively repeats a series of operations without the use of jigs and fixtures. Read more about these features and many other points of Lucas leadership — write for the complete story in detail. Lucas Machine Division, The New Britain Machine Company, 12302 Kirby Avenue, Cleveland 8, Ohio.



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The NEW BRITAIN MACHINE COMPANY

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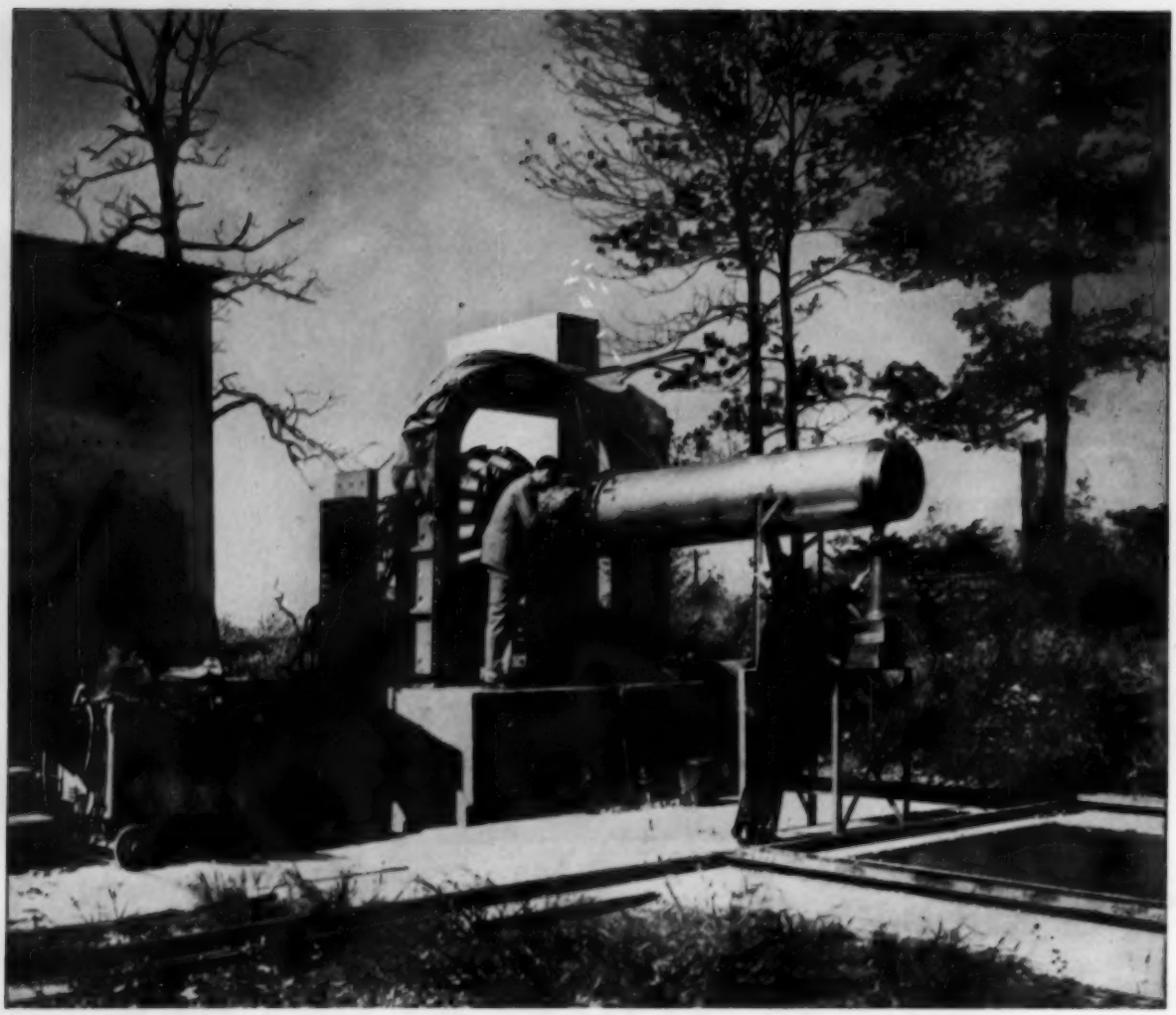
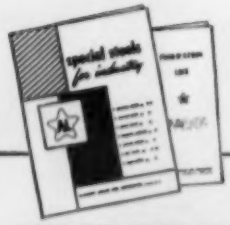
See the preceding four pages for other New Britain *New's.*





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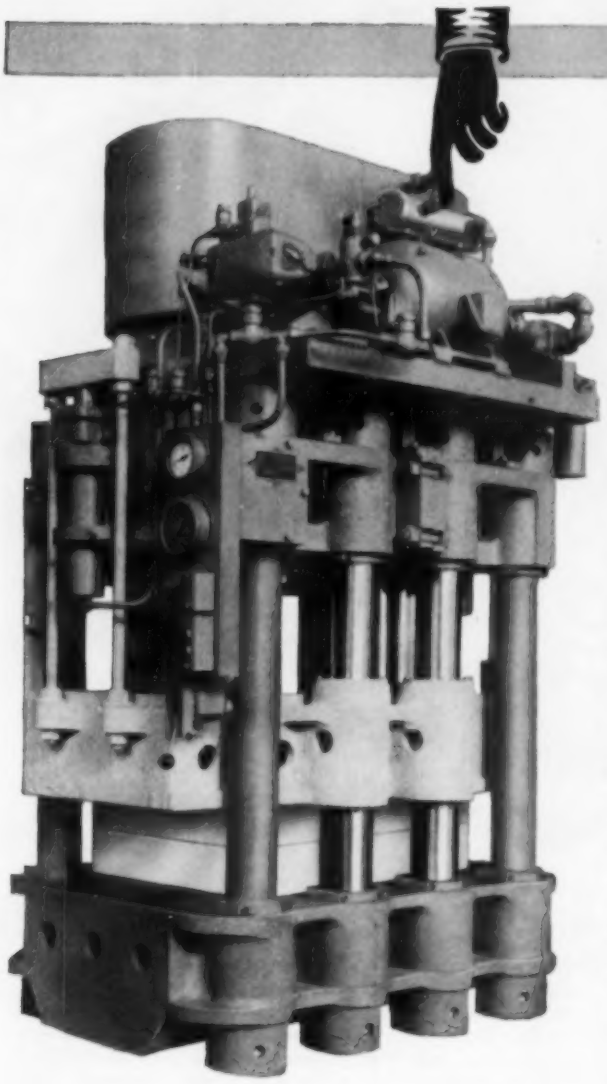

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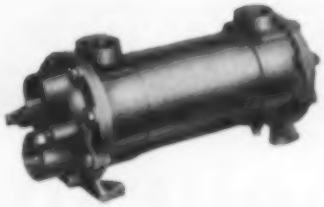

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OF MEETINGS

February 28-March 2, American Management Association: Special conference on electronics, Hotel Statler, New York. Association address: 330 W. 42nd St., New York 36. Vice president-secretary: James O. Rice.

March 1-2, American Society of Mechanical Engineers: International congress on air pollution, Hotel Statler, New York. Society address: 29 W. 39th St., New York 18. Secretary: C. E. Davies.

March 1-3, Society of Automotive Engineers Inc.: Passenger car, body and materials meeting, Sheraton-Cadillac hotel, Detroit. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

March 7-11, National Association of Corrosion Engineers: Annual meeting and exhibit, Palmer House, Chicago. Association address: 1061 M & M Bldg., Houston 2. Secretary: A. B. Campbell.

March 8-10, Instrument Society of America, Pittsburgh Section: Instrumentation in the iron and steel industry, Hotel William Penn, Pittsburgh. Information: A. F. Robbins, combustion engineer, Crucible Steel Co., Midland, Pa.

March 10-11, Porcelain Enamel Institute: Pacific coast conference, Biltmore hotel, Los Angeles. Institute address: 1346 Connecticut Ave., N.W., Washington. Secretary: John C. Oliver.

March 13-18, National Electrical Manufacturers Association: Winter meeting, Edgewater Beach hotel, Chicago. Association address: 155 E. 44th St., New York 17. Managing director: W. J. Donald.

March 14-16, Society of Automotive Engineers Inc.: Production meeting and forum, Netherland Plaza hotel, Cincinnati. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

March 14-18, American Society of Tool Engineers: Western industrial exposition, Ambassador hotel and Shrine Auditorium, Los Angeles. Society address: 10700 Puritan Ave., Detroit 21. Executive secretary: Harry E. Conrad.

March 15-16, Steel Founders' Society of America: Annual meeting, Drake hotel, Chicago. Society address: 920 Midland Bldg., Cleveland 15. Secretary: George K. Dreher.

March 15-17, American Institute of Electrical Engineers: National conference on electrical utilization of aluminum, William Penn hotel, Pittsburgh. Institute address: 33 W. 39th St., New York 18. Secretary: N. S. Hibshman.

March 16-18, Pressed Metal Institute: Annual meeting and exhibit, Carter hotel, Cleveland. Institute address: 2860 E. 130th St., Cleveland. Managing director: Orrin B. Werntz.

March 16-19, Industrial Diamond Association of America: Annual meeting, Hollywood Beach hotel, Hollywood Beach, Fla. Association address: 124 E. 40th St., New York. Secretary: Athos D. Leveridge.

March 20-23, National Association of Waste Material Dealers Inc.: Annual meeting, Conrad Hilton hotel, Chicago. Association address: 271 Madison Ave., New York. Secretary: Clinton M. White.

March 21-23, Association of Iron & Steel Engineers: Western meeting, St. Francis hotel, San Francisco. Association address: 1010 Empire Bldg., Pittsburgh 22. Managing director: T. J. Ess.

March 22-24, International Acetylene Association: Annual meeting, Shamrock hotel, Houston. Association address: 30 E. 42nd St., New York 17. Secretary: H. F. Reinhard.

March 24-25, American Hot Dip Galvanizers Association Inc: Annual meeting, Brown hotel, Louisville. Association address: 1506 First National Bank Bldg., Pittsburgh 22. Secretary: Stuart J. Swensson.

March 24-25, American Machine Tool Distributors Association: Spring meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: 1900 Arch St., Philadelphia 3. Secretary: Thomas A. Fernley Jr.

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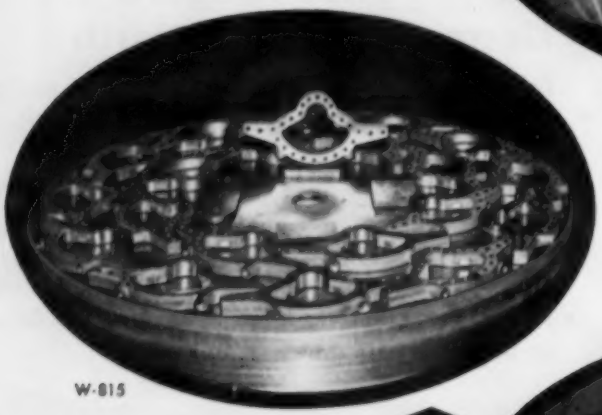
W-1102

Blanchard surface grinders are noted for their ability to save time and labor in machining flat surfaces. For example, a No. 18 Blanchard machines the steel blocks shown above at the rate of 4 cubic inches per minute . . . and produces finished tolerances for flatness, parallelism and dimension of .001" to .002"!



W-815

By dressing the chuck and using the correct wheel, the same Blanchard will finish grind pump parts to a flatness of .0002" . . . with surface finish of 4 to 6 micro-inches . . . at a rate of 40 pieces (80 surfaces) per hour!

Blanchard ground to make *tight* joints! These valve plates are used in refrigerator compressors.

W-802

No. 18 Blanchard Surface Grinder

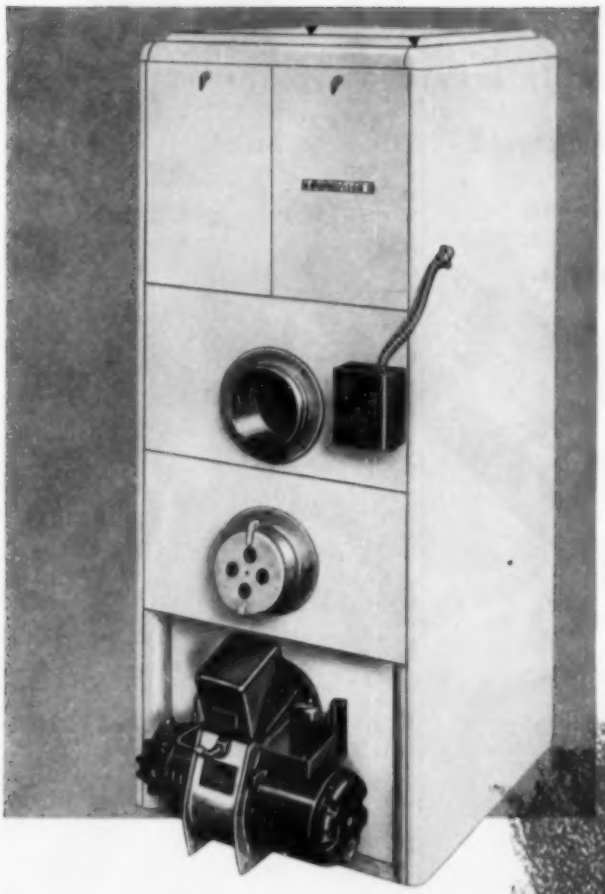
Obsolete machining methods often result in high costs and low profits. If you are not getting maximum production, consider using Blanchard surface grinders. They're economical, extremely accurate and highly productive on a wide variety of jobs. And they enable you to make a decent profit at competitive prices.

Send for free copies of "Work Done on the Blanchard", (fourth edition), and "The Art of Blanchard Surface Grinding".

PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE COMPANY

64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.

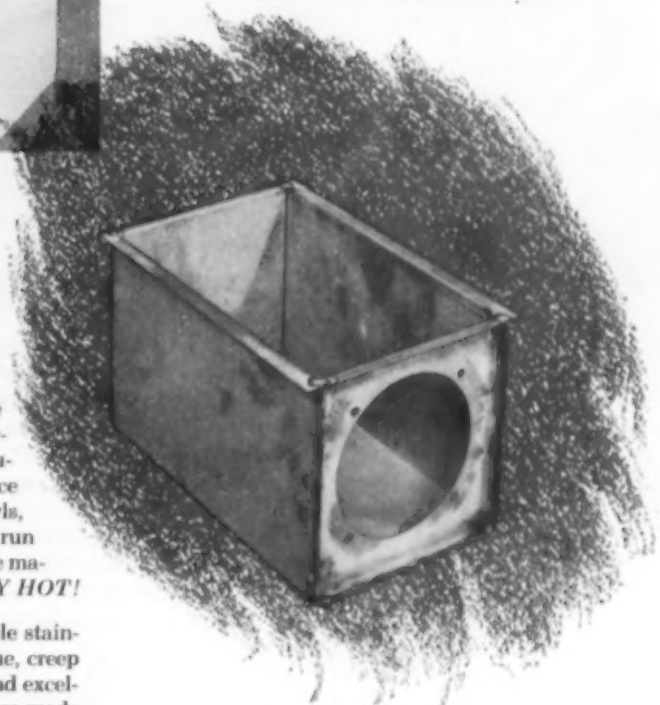


If it's meant to get

HOT

...use

CRUCIBLE STAINLESS



Crucible Type 430 firebox for the Perfection OC 90V Oil-Fired Furnace.

Say *"stainless steel,"* and most everyone thinks of bright appearance . . . corrosion resistance . . . strength without excess weight. But these properties are actually secondary in some applications.

As an example, take stainless steel's remarkable resistance to heat. That's the reason why The Perfection Stove Company uses types 309 and 430 Crucible stainless steels for its gas- and oil-fired furnace components — fireboxes, throat and burner bowls, combustion chambers, and baffles. In the long run stainless is the most dependable and least expensive material they can use for these parts that get *REALLY HOT!*

Of course, in addition to heat resistance, Crucible stainless steels offer corrosion resistance . . . high fatigue, creep and structural strength . . . resistance to wear . . . and excellent workability. And at Crucible, stainless steels are made by specialists who are concerned only with special purpose steels. They welcome the opportunity to help you select the best grade for the job. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

BROWNHOIST Diesel powered railroad cranes help insure low cost operation and improved service on America's railroads

In any extensive Dieselization program, cost-minded railroad men include BROWNHOIST Diesel-powered railroad wrecking cranes. Designed especially for railroad service, these powerful, efficient BROWNHOIST units help keep costs down. Their engineering simplifies operation and maintenance, their rugged construction insures long life. Capacities from 80 to 250 tons. Consult a BROWNHOIST representative or write us today for complete information.

BROWNHOIST MATERIALS HANDLING EQUIPMENT GIVES A LIFT TO AMERICAN INDUSTRY

INDUSTRIAL BROWNHOIST CORPORATION
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BROWNHOIST

here's the key to a

SUCCESSFUL MAINTENANCE PROGRAM

THE REMINGTON RAND KARDEX record combines in a single pocket, ready for instant reference, the complete history of the machine, machine characteristics, repetitiveness of repairs and a record of maintenance service and costs.

Through the use of colored signals the preventive maintenance program is visibly signalled, allowing you to analyze your preventive program at any time *in a matter of seconds.*

You will also need an inventory control system for spare parts. An effective stores control system is as important to your maintenance control program as is your work force. Without proper inventory control of parts, valuable production will be lost and machine down time will be greatly increased.

Both of these records are shown in our booklet on Maintenance Management. This booklet also contains information on how to:

1) Keep Within Your Operating Budget
2) Reduce Emergency Work Through Planned Maintenance
3) Schedule Man-Hours and Cut Idle Time

Send today for this 8-page booklet which shows in detail, in flow-chart form, how you can streamline your whole maintenance operation at the lowest clerical and equipment cost.

Remington Rand

Room 1261, 315 Fourth Ave., New York 10

Kindly send your free booklet "Assured Equipment Productivity Through Maintenance Management"-X1383.

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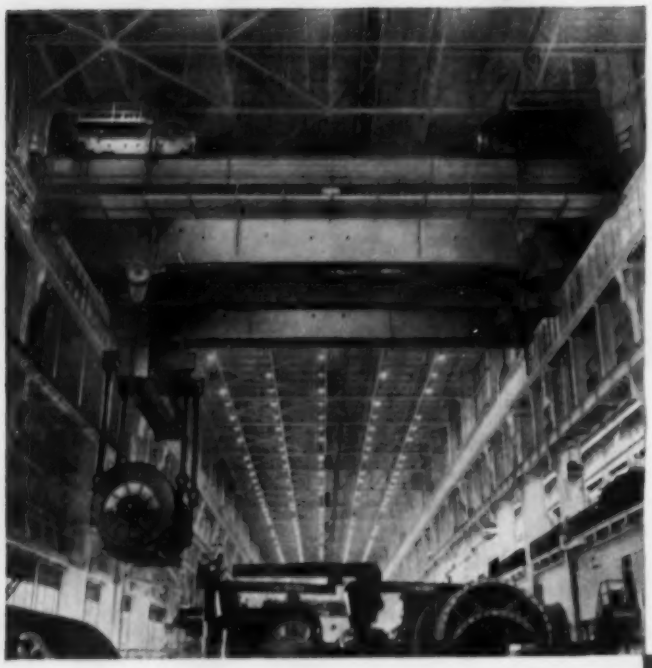
heavy handling costs less WITH A Whiting Crane!



The overhead crane that saves its user money is one that is *just right* for its specific job. "Too little" crane is as costly as "too much" crane. Whiting —with more than 60 years' experience in crane construction for firms throughout industry— engineers "just enough" crane for *future* as well as *immediate* needs. More efficient crane operation also helps to lower costs. For example, the new Whiting Selectodyne controls assure the fastest, most accurate lifting, moving and spotting. Ingenuity of Whiting Crane design makes possible large savings in maintenance. Better materials are used in Whiting Cranes . . . anti-friction bearings and precision-made gears reduce friction and wear problems . . . securely-fitted shafts and flanged couplings that stay tight provide peak performance. These, and many other outstanding Whiting Crane features mean a longer, trouble-free life that results in low-cost handling! Before you invest in any crane . . . investigate the Whiting Crane!

WHITING CORPORATION
15643 Lathrop Avenue, Harvey, Illinois

Write for the new Whiting Crane Bulletin—Unit 80 . . . gives complete information on the 14 outstanding Whiting Crane features! Send for it today!

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ENGINEERED CRANES

Foundry Equipment

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This picture shows a COR-TEN Steel container and an assembled wing tank mounted on it for display purposes.

(Below) All these components for six 450-gallon wing tanks are ingeniously nested and carried in a single Royal Jet Tank Can made of USS COR-TEN Steel. Tanks can be easily and quickly assembled in the field.

How containers for jettisonable fuel tanks—made of USS COR-TEN Steel—save 40% in shipping and storage space—reduce weight 25%—cost 10% less than crates

Shipped six-at-a-time in these COR-TEN Steel "cans," 450-gallon wing tanks for jet aircraft now travel more safely and more cheaply to their distant destinations. Not only are they better protected than ever before against shipping and landing hazards but they are indefinitely preserved in storage.

Royal Jet, Inc. of Alhambra, Calif., developer, designer and manufacturer of these efficient containers, has found COR-TEN Steel the most satisfactory material from the standpoint of lightweight, permanence, ease of manufacture and reasonable cost.

For with USS COR-TEN Steel which is 50% stronger than carbon steel and offers 4 to 6 times greater resistance to atmospheric corrosion they can use light 12 ga. and 18 ga. sheets to build containers of great strength and ruggedness that weigh 25% less than wooden crates.

These steel containers offer other advantages, too. Hermetically sealed and filled with dry air they contain sufficient dessicant to insure minimum moisture content. Since no organic materials are used in the padding, fungus growth and interior corrosion are eliminated. As a result the sealed-in tanks stay factory-new regardless of temperature, climate or length of storage. Containers can be stored in the open for an indefinite period with a minimum of damage or deterioration.

This new packaging technique pays off. By replacing wooden crates, formerly used, with these COR-TEN Steel containers, weight per wing tank shipped has been materially reduced, 40% less storage and shipping space is required and the shipping cost to Europe, for example, has been reduced $21.36 per tank—a saving to the Government, on only 100,000 tanks, of more than $2,000,000.

SOON TO BE ISSUED. Our new "Design Manual for High Strength Steels" contains comprehensive and practical information that you will find extremely useful in designing your product for greater economy and efficiency by the use of high strength steels. Watch our future advertisements for the announcement of the availability of this important publication.

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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS COR-TEN HIGH Strength STEEL

USS

9-440

UNITED STATES STEEL

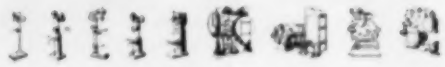
WHAT ONE MACHINE CAN DO ALL THESE JOBS?

Punch, slit, miter, shear flat bars
Cut, notch, cope, punch angles, tees, channels, I-Beams
Punch web and flange of channel
45° Miter
Trim leg of tee
Cope Angle leg
Cut rounds, squares, reinforcing bars

"Buffalo" UNIVERSAL IRON WORKER

Think of the time, space and money savings a U.I.W. could bring to your metalworking operations—one husky, rapid machine handling the work of five—two jobs going on at once! You save conveying work from punch to shear to bar cutter. You save tool changing time—the U.I.W. is the only machine with built-in notcher and coper *plus* shear with wide stripper bar *plus* large tooling space for combination channel, beam and bar cutter knives *plus* miter pin for 4 instant miter settings. Rigid, arc-welded plate frame, one-shot lubrication. It's all part of the "Q" Factor* you get in all "Buffalo" products. Write for Bulletin 360E for all sizes and details.

*The "Q" Factor—
the built-in Quality which provides trouble-free satisfaction and long life.



"Buffalo"

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148 Mortimer St. Buffalo, New York
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For the metal fabricator, the strength of Titan brass also means beauty that lasts, durability against abrasion and wear, and corrosion resistance. Couple these qualities with the high-speed low-cost machinability of Titan brass, and you have a world of advantages offered by brass. Free-cutting brass rod, for example, is the most easily machined of all metals.

To get the most in metals, call your nearest Titan Office, Distributor or Depot. And send for free booklet "Brass Means Business" describing 1) Titan products and 2) the first full-color, sound motion picture on brass manufacture and uses. It's yours free!

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Gentlemen: Please send free booklet titled "Brass Means Business".

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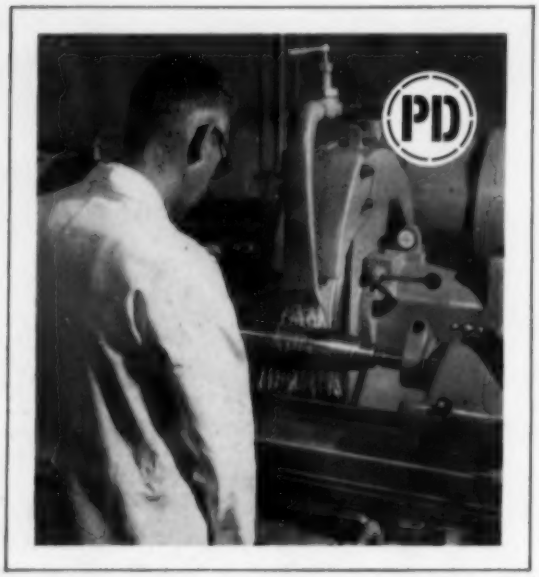
A remarkable development that can save you money

Just as a NEGATIVE guarantees you an exact duplication of a photograph each and every time, you are always assured a . . .



. . . POSITIVE DUPLICATION of an original grinding wheel each and every time through the CINCINNATI (PD) Manufacturing Process.

NOW!

Cincinnati Grinding Wheels offer

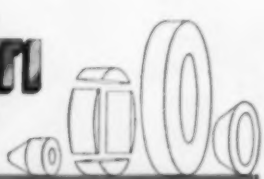
PD Positive Duplication

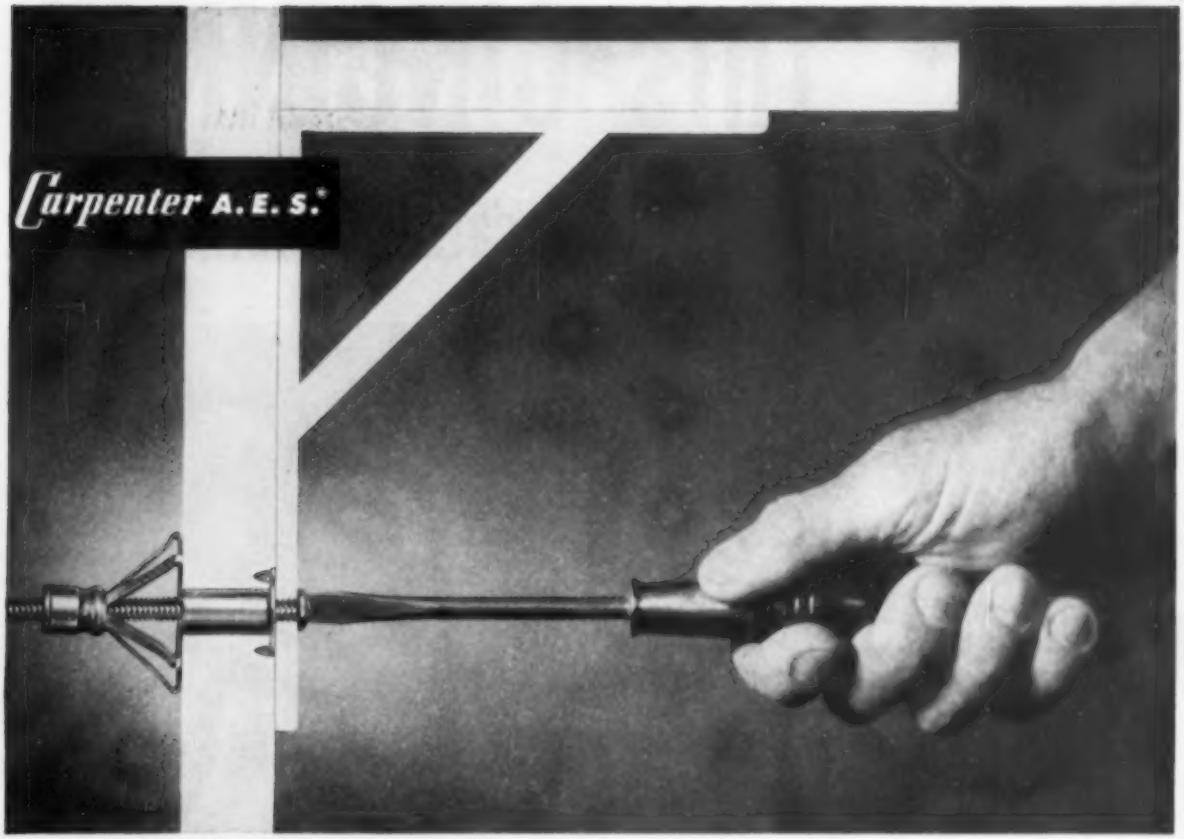
Positive Duplication is the most talked about grinding wheel development in years. And it's important to *you*, for this achievement in precision manufacturing and quality control can *save you money* . . . and *increase your production!*

Through the CINCINNATI (PD) Manufacturing Process you are assured a Positive Duplication of the original wheel *every* time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will *act and grind exactly alike. Yet they are priced no higher than ordinary wheels.*

Let us prove to you how CINCINNATI (PD) WHEELS can save you money and increase your production. Just contact us and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

CINCINNATI
Grinding Wheels





Help for Handymen at Home

*Another example of how Carpenter *Application Engineering Service is helping industry cut costs.*

Ever try to turn a screw through plaster into a hollow wall? The result is usually disastrous . . . unless a device, such as this patented screw anchor, is used. With this anchor it's an easy matter to drill a hole, insert the device, then turn it tight. And it holds securely. But you'd be surprised at the production problems involved, even with a small item like this. For example, it's a highly competitive product turned out in huge quantities. This means that the tools and dies used to make it have to be just right—they have to hold sharpness, be accurate, provide adequate toughness, and hold up in the presses with no trouble while producing millions of parts.

To help control production costs, the manufacturer called on Carpenter Application Engineering Service for counsel in selecting die steels for the different sections of the progressive dies. A.E.S. supplied the answer—recommended five different steels in the Carpenter Matched Set . . . each engineered to perform its job best. Here, in the manufacturer's words, is the result: "With the help of Carpenter die steels we've been able to control our production costs so closely that there has been no price increase in the last five years!" (A detailed Field Report on the tooling for this job is available on request.)

Time and again, industry is finding new ways to hold costs in line and improve product sales with the help of Carpenter Application Engineering Service. A.E.S. is a service backed by almost 70 years of leadership in specialty steel development. It embraces trained Field Engineers, experienced representatives, competent Mill Metallurgists ready to work with you for best results. A.E.S. starts with your first call to Carpenter. THE CARPENTER STEEL COMPANY, 139 W. Bern St., Reading, Pa.

Carpenter STEEL

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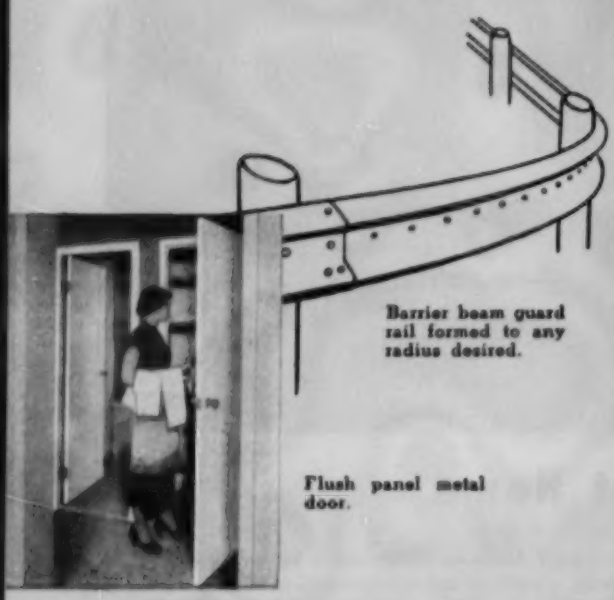
Pioneering in Improved Tool, Alloy and Stainless Steels Through Continuing Research

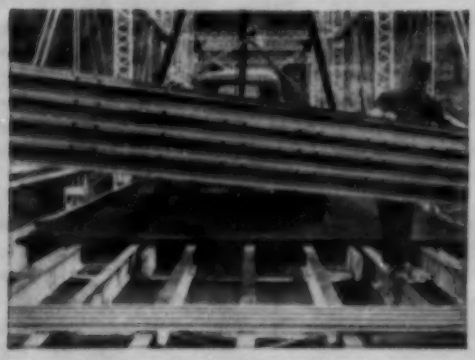
this CINCINNATI

is giving accurate and versatile performance at

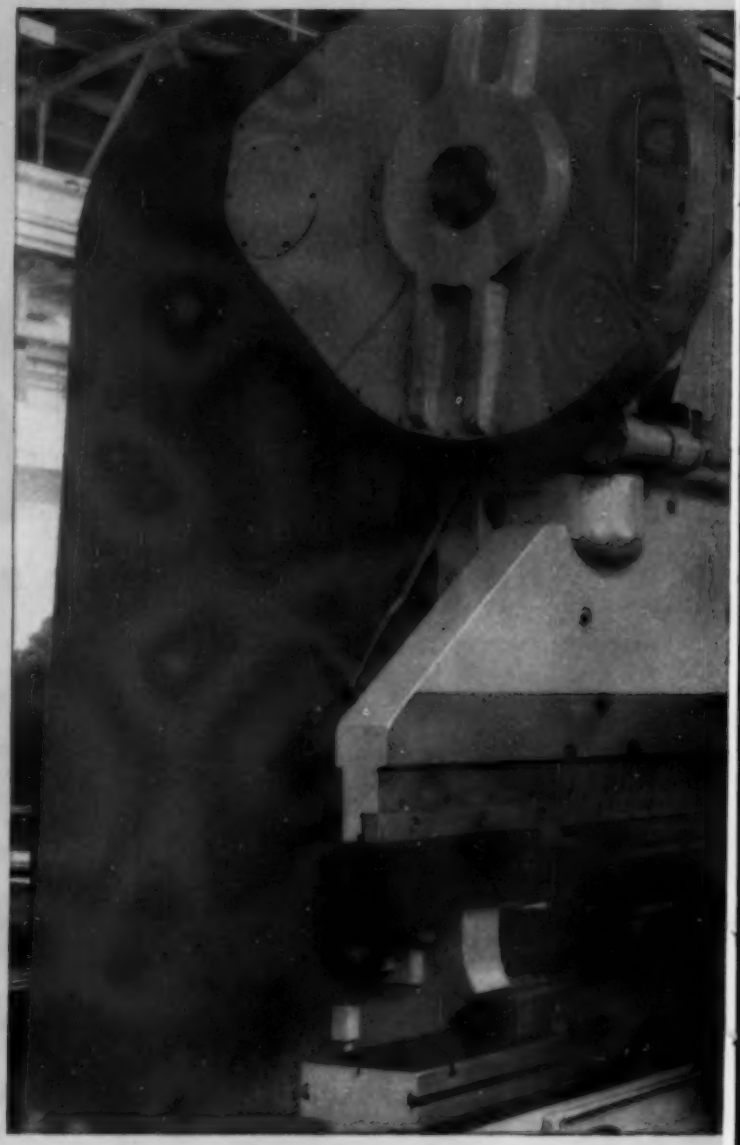


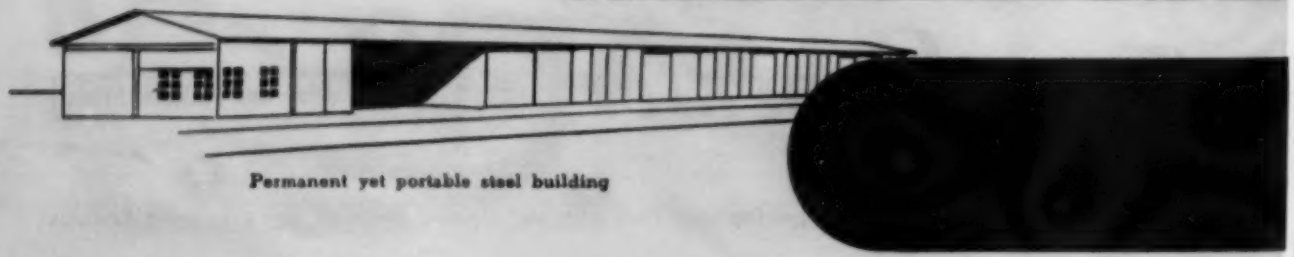
Barrier beam guard rail formed to any radius desired.

Flush panel metal door.



Formed structural bridge flooring

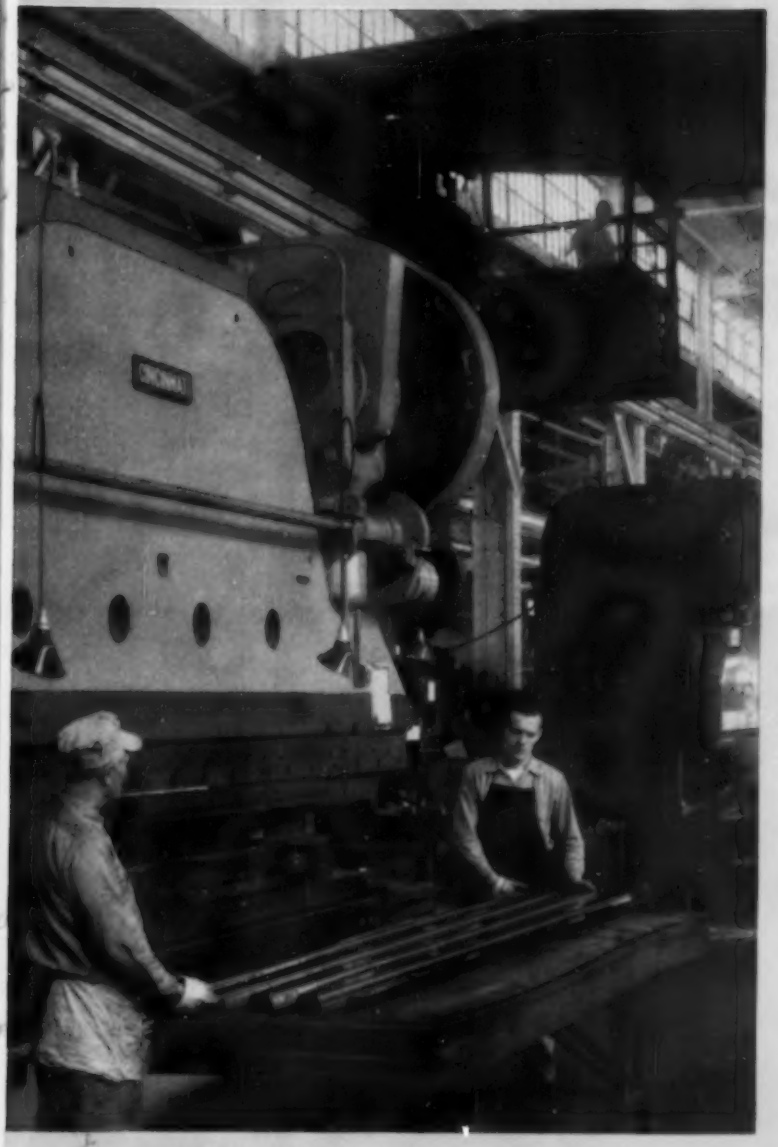




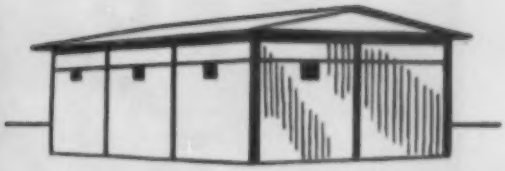
Permanent yet portable steel building

PRESS BRAKE

UNITED STEEL FABRICATORS, Inc.



Photos courtesy of United Steel Fabricators, Inc., Wooster, Ohio



All steel buildings of a thousand uses

WITH ample capacity, this powerful 500 Series Cincinnati Press Brake with 18′ 6″ clearance between housings and 22′ die area—handles formed structural bridge flooring, guard rails, steel doors. Girders and side walls for various types of metal buildings are also produced. United Steel Fabricators, Inc. are pleased with the accuracy in forming and ease and speed of operation which are important factors in this economical production.

INVESTIGATE:

—Cincinnati Center Line Loading

—Cincinnati Interlocked Construction

—Cincinnati Rigid Deep Beds and Rams

Write for the latest Press Brake Catalog B-4.

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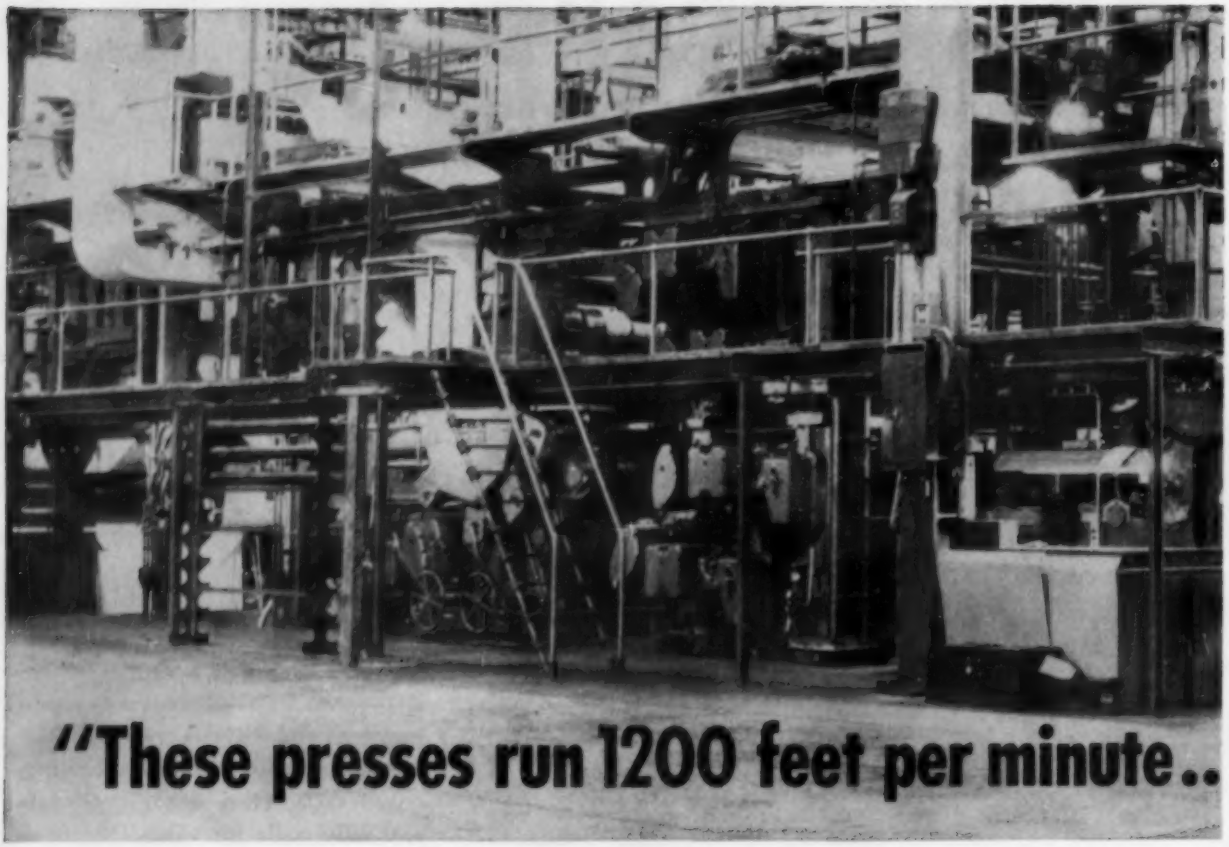
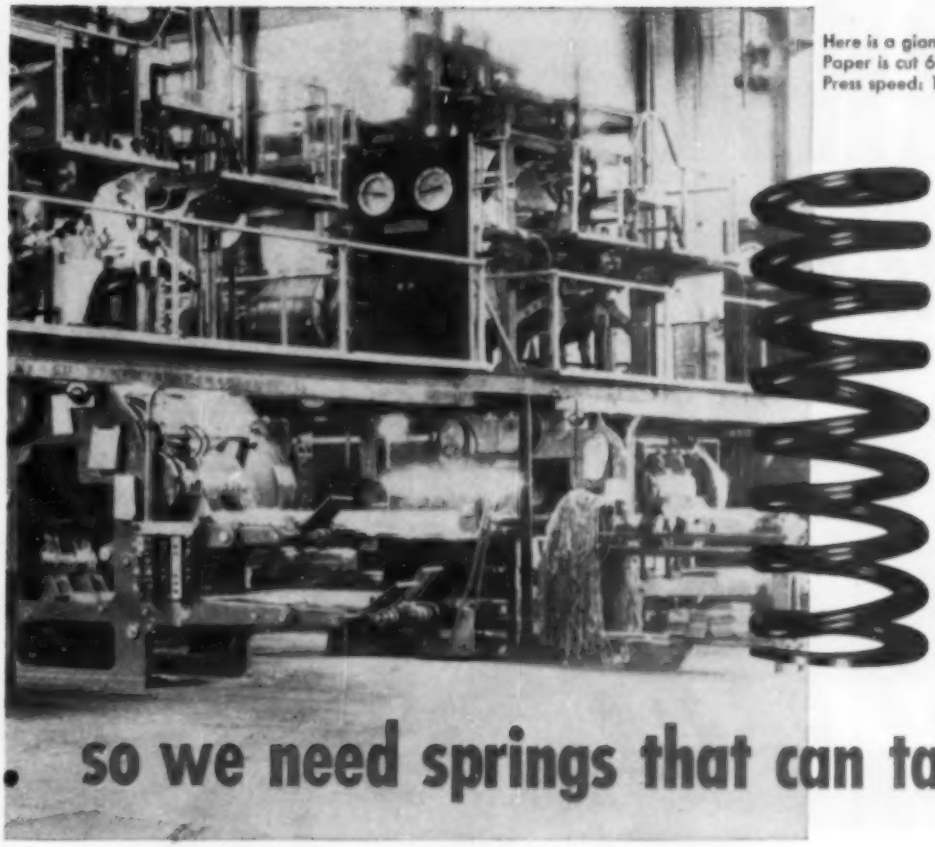


"These presses run 1200 feet per minute..

Cutting knife enters the slot visible in these knife assemblies. Springs maintain pressure on the paper during cut.



Here is a giant multicolor magazine press in action. Paper is cut 640 times per minute. Press speed: 1200 feet per minute.

. . so we need springs that can take it"

says Goss Printing Press Company, world's largest manufacturer of newspaper, magazine and rotogravure presses

● 74% of the world's daily newspapers are printed on Goss equipment. Some of the presses are nearly a city block long—giant, roaring machines that gobble up newsprint at the rate of 1200 to 2000 feet per minute. Many of the largest magazines also are printed on Goss presses, which run up to 1200 feet per minute.

At one end of the press is the cutting cylinder, where the paper is cut "on the run." 640 times a minute, the sharp steel knife snaps in and out between two spring loaded fibre "cushions" that hold the paper against the cutting cylinder. When the knife retracts, the springs push the cushions back out of the way.

According to Mr. William Zimmer, Asst. Chief Engineer, "Inferior springs would fail, jam the cutting cylinders, wedge the folding mechanism, and cause severe damage. I don't think that a spring could have a tougher job; but we've been using American Quality Springs for 20 years with excellent results."

American Quality Springs are available in any size, any quantity, any steel, style or finish—including flat wire and special shapes. Just get in touch with your American Steel & Wire representative.

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USS American Quality Springs

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UNITED STATES STEEL

WORRIED about rising costs of parts machined from BRASS?

SAVES YOU MONEY...
machines at rates approaching brass.

For years progressive manufacturers of screw machine parts have been changing from brass to Super LA-LED for many of their difficult-to-machine parts, at very substantial savings.

Parts machined from Super LA-LED cut material costs at least in half. This is out-of-pocket money which directly affects finished-part costs. Our engineers have a broad background of experience with this material. Their assistance is available to you in setting up your machines to handle Super LA-LED.

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MANUFACTURERS OF AMERICA'S MOST COMPLETE LINE OF QUALITY COLD-FINISHED STEEL BARS

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Oil seal separates two different areas in sleeve
Sleeve with oil seal is placed in fixture for swaging

Hired for one job— this DENISON MULTIPRESS® does 21 more

INTERCHANGEABLE tooling and an accurate, fast-acting Denison Index Table make it possible.

This 75-ton Denison hydraulic Multipress with six-station Index Table handles 22 swaging jobs for Mechanics Universal Joint Division, Borg-Warner Corporation.

For setup, the operator simply changes punches. The Denison Index Table, hydraulically interlocked with the Multipress ram, indexes from 10 to 70 times a minute . . . maintains limits of plus-or-minus two-thousandths.

This application—ring-swaging oil seals for universal-joint assemblies—shows what Multipress can do. Replacing a punch press, Multipress raised production 36 per cent . . . lowered labor costs 30 per cent.

Denison Multipress combines speed, accuracy and safety for swaging, testing, assembling and many more applications in the 1-to-75-ton pressure range. For bulletins, write to:

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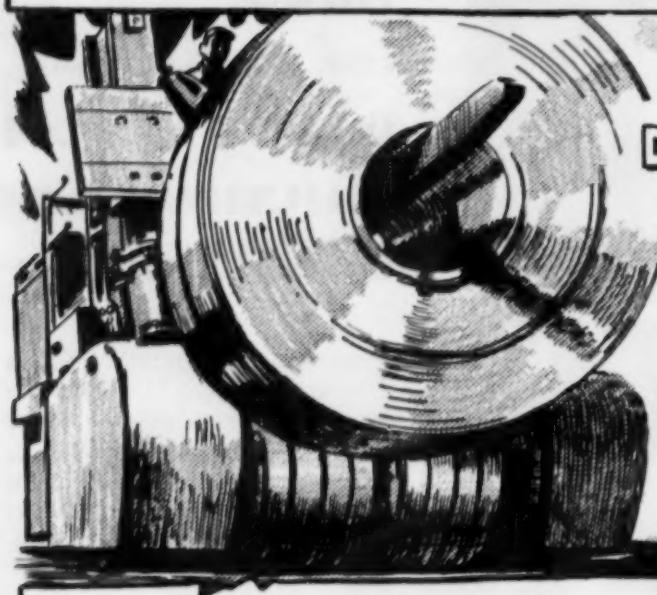
FACTS ABOUT Exide®

IRONCLAD® INDUSTRIAL TRUCK BATTERIES

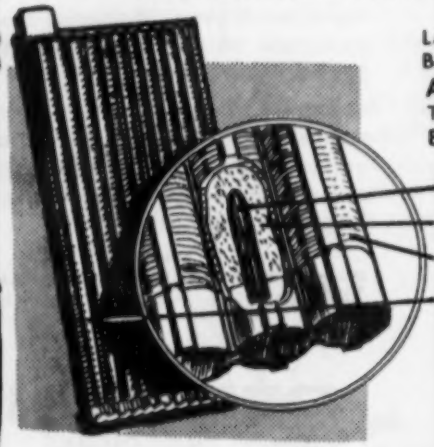


DOING A GIANT'S WORK AT LOWEST COST WITH EXIDE-IRONCLADS

STEEL MILLS USE GIANT **EXIDE-POWERED** RAM TRUCKS TO HANDLE HUGE COILS OF SHEET STEEL WEIGHING AS MUCH AS 30 TONS EACH. THEY WORK FULL-SHIFT WITHOUT COSTLY DOWN-TIME DELAYS -AROUND THE CLOCK. **EXIDE** DEPENDABILITY AND EXCEPTIONALLY LONG USEFUL LIFE RESULTS IN LOWEST HANDLING COSTS PER TON.

BATTERIES ARE WORKED TO DEATH BY EXIDE ENGINEERS TO LEARN SECRETS OF LONGER LIFE

SINCE 1910, RESEARCHERS HAVE GREATLY IMPROVED EXIDE-IRONCLAD PERFORMANCE AND USEFUL WORKING LIFE, BUT THE BASIC IRONCLAD PRINCIPLE OF TUBULAR CONSTRUCTION REMAINS THE SAME.



LAB TESTS OF IRONCLADS AGAINST CONVENTIONAL TYPES OF BATTERIES SHOW THAT THEY GIVE BETTER PERFORMANCE... **AND FROM 20% TO 30% LONGER LIFE!** THESE TWO FACTS, DEMONSTRATED BY THOUSANDS OF BATTERY USERS, ARE THE REASON WHY...

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- COMPRESSED ACTIVE MATERIAL
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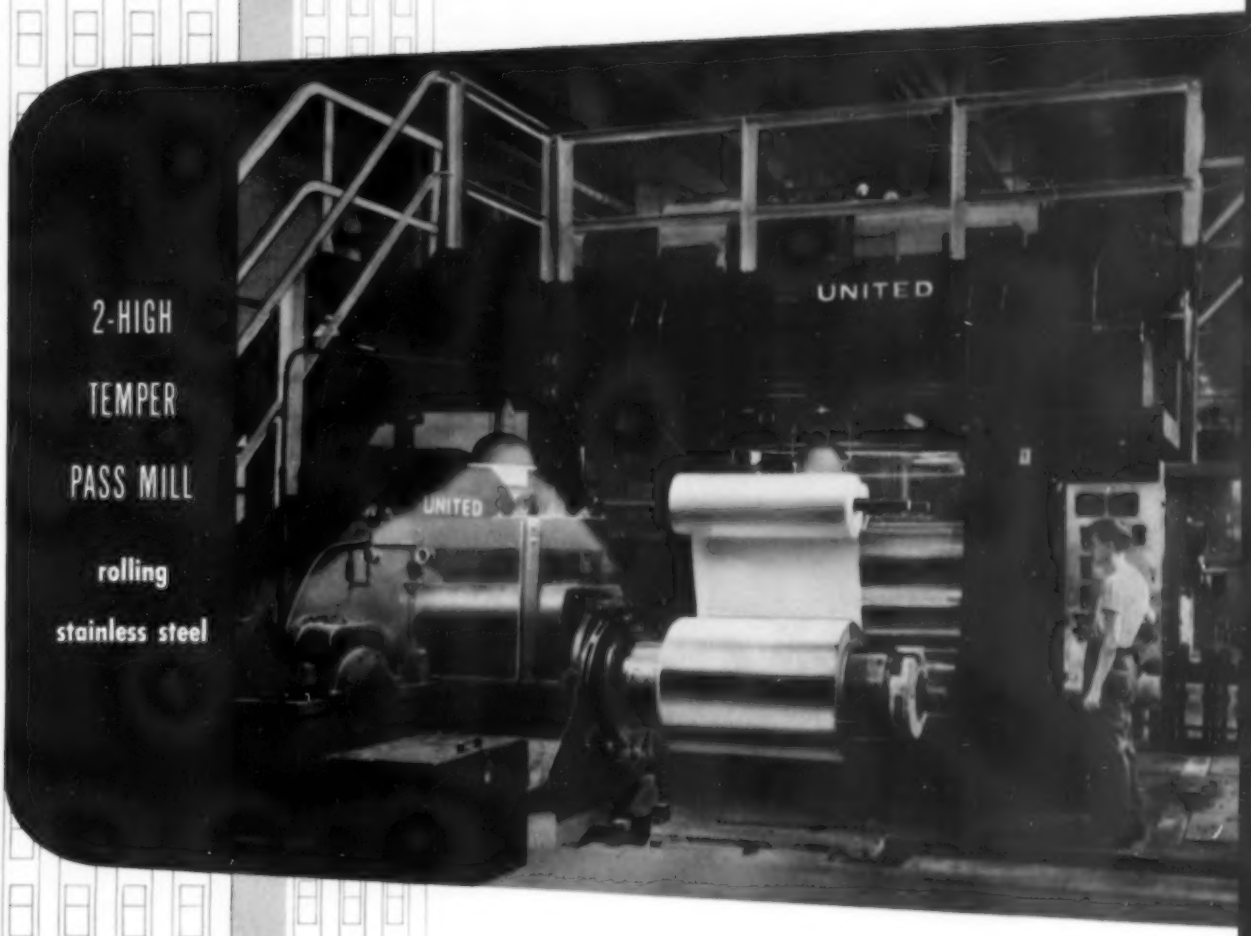
LET EXIDE HELP SOLVE YOUR INDUSTRIAL TRUCK BATTERY PROBLEMS ❶ CALL AN EXIDE SALES ENGINEER FOR FULL DETAILS ❷ WRITE FOR FORM 1982, A MANUAL ON INSTALLING AND MAINTAINING MOTIVE POWER BATTERIES

Exide INDUSTRIAL DIVISION, The Electric Storage Battery Company, Philadelphia 2, Pa.



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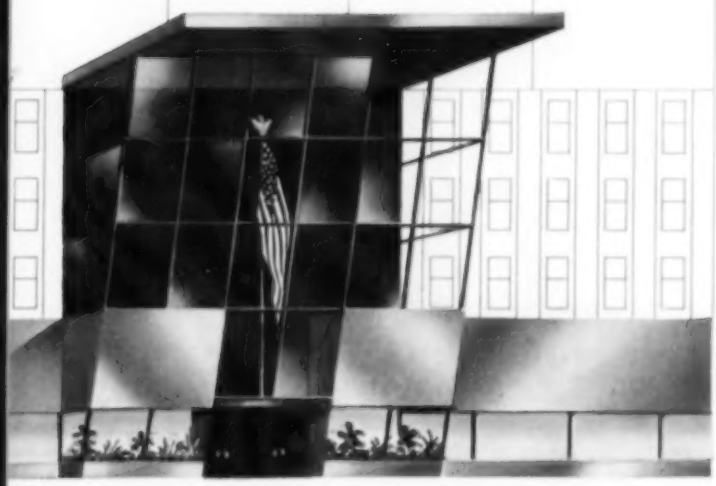

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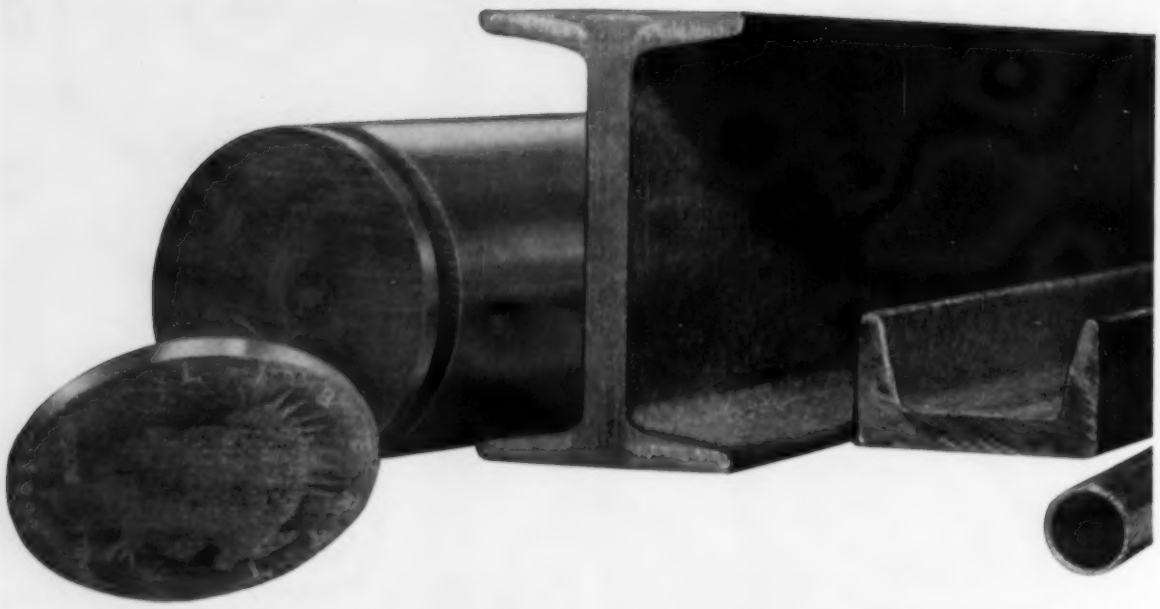

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You might be shocked to find how fast the hidden costs of carrying steel inventories add up! We know because steel inventories have been our stock in trade for over a hundred years.

But you don't *have* to tie up plant space and capital in steel you won't use for many weeks—may never use if products or markets change quickly. You don't *have* to lay out cash for cutting and handling equipment, incur unnecessary scrap loss, or divert manpower to unproductive inventory work.

Instead, you can hold your own inventories to a practical minimum and draw on Ryerson inventories as current requirements arise. At Ryerson you have the world's largest stocks at your disposal—plus unequalled facilities for preparing steel to your order—so you can get delivery of any kind of steel in practically any quantity, within a few hours.

That's why we urge you to consider *all* your costs when setting inventory policy. And let Ryerson help you release more of the money in steel inventories for profit-producing opportunities. Our inventory experience is at your service.

RYERSON STEEL

Principal products in stock: bars, structurals, plates, sheets, tubing, alloy and stainless steel, reinforcing steel, etc., also machinery and tools

RYERSON CERTIFIED STEELS

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Local 600 Sounds Off

Local 600, representing workers at Ford Rouge plant and the biggest local in the CIO's United Auto Workers, wants: "To prevent auto companies from stockpiling cars; to distribute the strike fund as a matter of right, not need; to establish that a shorter work week will be our next major objective; and to establish that the age for retirement be reduced to 60 years with 25 years of service." These are Local 600's "main objectives" for action at UAW's convention, which starts in Cleveland on Mar. 27.

Between the Lines?

Don't read too much into the "steady employment" article that Ford Motor Co.'s management presented in its employee paper, "Ford Rouge News." The story tells how layoff periods have been reduced, high employment maintained and average earnings increased over the past years. Some observers claim the article is an indication that Ford will fight the guaranteed annual wage to the last ditch. Some of the same observers earlier were claiming that Ford was going to settle with the UAW for some modified form of GAW. Actually, the article is rather routine, similar to scores of such stories that have appeared in many other house organs.

How Workers Use T-H

Another new high in employees' use of the Taft-Hartley Act to protect themselves against union abuses is shown in the National Labor Relations Board's statistical report for last year's final quarter. Employees filed more than 65 per cent of the unfair labor practice charges against unions during the period. Other unions filed 5 per cent, leaving only 30 per cent filed by employers.

Industrial Paternalism

Company-paid sick leave and group insurance plans are providing compensation against wage losses owing to sickness and disability for 80 per cent of the workers in 963 companies. Those firms participated in a study by the National Industrial Conference Board. In programs for salaried employees in 468 of those firms, the board found that 49 per cent have formal sick-leave plans, 48 per cent have group accident and sickness insurance schedules and 47 per cent give direct cash payments to employees to supplement workmen's compensation. A study of hourly plans in 495 companies revealed that 84 per cent provide group insurance, 14 per cent give supplements to workmen's compensation and 14 per cent have formal sick-leave provisions.

For U.S. Research: $2 Billion

Federal research and development activities have leveled off at the $2-billion mark after almost a twenty-fold increase since 1940. The lion's share of funds goes to the Defense department—about three-fourths of the total. The Atomic Energy Commission administers an additional 12 to 13 per cent. In all, seven agencies account for more than 98 per cent of the funds. Allocations for applied research and development will de-

cline from $1.8 billion in 1953 to $1.7 billion in 1955, while funds for basic research are being increased in the same period from $116 million to $131 million.

Excise Refund Possible

Many manufacturers may be entitled to refunds on excise taxes as a result of a court decision regarding General Motors Corp.'s Frigidaire Division. The Court of Claims ruled that Frigidaire's expenses in fulfillment of a warranty constituted a "rebate" or "allowance" to the consumers and were deductible from the sales price for excise tax purposes. The U.S. says that the decision may cost it $27 million annually in revenues.

Toward More Flexibility

Look for more flexible enforcement of the various federal laws against price discrimination. Because of the difficulty in determining just what constitutes price discrimination, the prohibitions of the Robinson-Patman Act have been widely disregarded. Federal Trade Commission Chairman Edward F. Howrey blames that difficulty on over-rigid interpretation of the act. A special committee is studying the problem of cost-price relationships in an effort to develop standards of proof and guides in cost determination.

Predictions for 1965

Here are predictions for the next decade, made by Ralph M. Robey, professor of banking at the University of South Carolina. Speaking to Bristol Brass Corp. officials, he said: World War III won't come; there will be no depression; federal taxes will take a smaller proportion of our national income in 1965 than now; commodity prices will not vary seriously over the next ten years; unemployment will not exceed 5 million for six consecutive months at any time during the next decade; population will rise from the present 163 million to about 190 million by 1965; gross national product will rise from the current $360 billion to about $500 billion by 1965; corporate profits will total some $25 billion in 1965, compared with the current $17 billion to $18 billion.

Straws in the Wind

Look for union cash wage gains in 1955 to average less than 10 cents an hour . . . The Atomic Energy Commission will be the nation's largest power user this year, taking 9 per cent of our output. The National Tool & Die Manufacturers Association will ask the House of Representatives to include the deferment of apprentices and journeymen toolmakers during an emergency in the new military training bill, H.R. 2967.

This Week in Metalworking

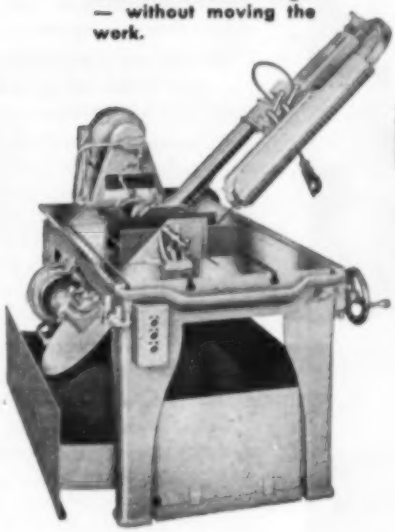
Copper and brass mills woo aluminum (p. 55) . . . The first quarter of this year may see the bottom in capital spending, and a near-record is possible in total 1955 expenditures (p. 57) . . . Some 8000 companies in the U.S. have profit-sharing plans (p. 58) . . . The starting pay for the college engineering graduate continues to rise; it's now $365 a month, compared to $350 a year ago (p. 60).

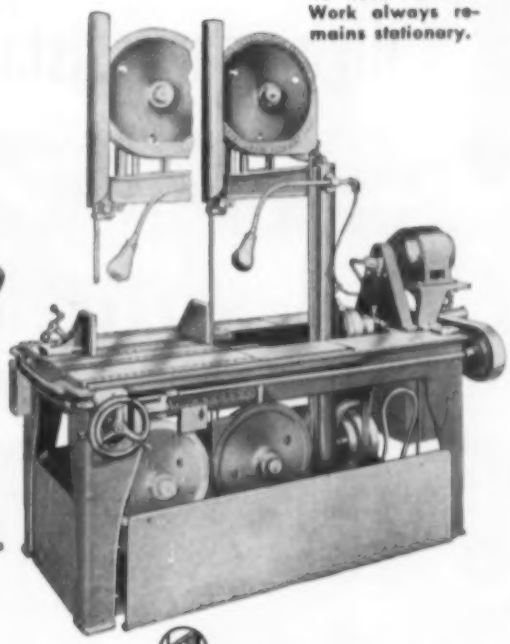
Never Confuse the No. 8 MARVEL with an ordinary Band Saw

...only the MARVEL is Universal

Only on a MARVEL No. 8 does the blade remain at a right angle throughout its full 18" feed traverse. Work always remains stationary.

Only on a No. 8 MARVEL can the saw column be instantly indexed and locked at any angle from 45° right to 45° left, and the saw then fed thru the work at the desired angle — without moving the work.





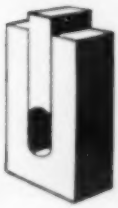
Only a No. 8 MARVEL can do all of these things: Snip-off a ½" rod or cut-off an 18" x 18" cross section

Rough to Size and Shape

Miter

Index

cut off and shape Structural Beams.



Only a No. 8 MARVEL has the large T-slotted work table, with removable quick action vise, that permits accurate set-ups of work of unrestricted sizes and shapes, special fixtures; Etc.

"Rough Machine" to size and shape with minimun chip waste

The No. 8 MARVEL is the "busiest tool in the shop" wherever installed because it is a *universal* tool—has both the capacity and the versatility to handle not only standard sawing jobs but innumerable "trick" and convenience jobs as well. More than a metal saw, the No. 8 MARVEL is a fine machine tool with machine tool features like: Both power and hand feeds; Depth Stops; Automatic Blade Tension; Built-in Coolant Pump; Three operating speeds (or six with 2-speed motor). Moisture-proof electrical controls that conform to both "J.I.C." and "MACHINE TOOL" electrical standards; Dirt-proof ball bearings, etc.

If you cut, machine or fabricate metal, this is a sawing machine you should know about. Write for catalog.

MARVEL Metal Cutting SAWS

Better Machines—Better Blades

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DoALL *finds that Nickel Alloys combine needed properties such as:*

High wear resistance plus ready machinability

Nickel Cast Irons, Nickel Steels and Ductile Iron contribute to the ruggedness and wear-resistance of grinders . . . standard and special . . . produced by the DoALL Company, Des Plaines, Ill. Bases, tables, saddles, vertical slides, taper gibs, wear strips and sub-plate, on standard surface grinders are of 1½-2% nickel alloy iron. This iron is also used for similar important castings in the DoALL special rotor plunge grinder.

SPECIFY almost any logical combination of strength, toughness, hardness, corrosion resistance or other needed properties . . .

And you'll usually find a standard material that exactly answers both your fabricating and service demands from among the many grades of nickel alloys.

In fact, you'll probably discover . . . as DoALL did . . . that nickel alloys provide advantages which no unalloyed composition can match.

Properties combined in nickel-containing alloys contribute, for instance, to the efficiency of many components in the widely used DoALL grinders . . . both standard and special. Parts that must combine a high degree of wear resistance plus ready machinability, for example, are cast in alloy irons containing 1.50 to 2.00% nickel.

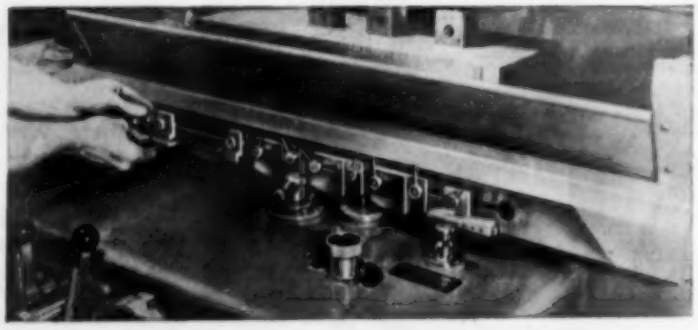
And components that call for resistance not only to wear, but also for some resistance to shock loads or sudden stresses, are cast in Ductile Iron fortified with about 1.50% nickel.

Spiral gears and arbors on standard DoALL types, and also pistons for special rotor grinders, are specified in a casehardened 8600 series nickel alloy steel. This grade of nickel-containing steel makes possible a wear-resistant surface supported by a core that resists fatigue and shock. A direct hardened steel of this same series is used for certain stressed gears in DoALL special grinders.

The advantages of weight saving, compactness, durability and strength . . . along with superior response to fabrication . . . may generally be obtained by using the correct nickel alloy. Whatever your industry, let us help you with your metal problems. Send us details for our suggestions. Write us today.

INCO
TRADE MARK

Ductile Iron trip dogs help DoALL grinders achieve peak precision and output. These components are easily spaced to speed up table motion desired between parts or jigs during slow "crush form" grinding of precision parts.



THE INTERNATIONAL NICKEL COMPANY, INC.

67 WALL STREET
NEW YORK 5, N. Y.

Free Trade Vs. Protectionism

Few subjects are evoking more bitter controversy and discussion nationally than the U. S. tariff policy. It affects the pocketbook of every American.

The tariff high-water mark came with the passage of the Smoot-Hawley Act in 1930. Since that time, tariffs have been reduced gradually through reciprocal trade agreements. Today, they are among the lowest for any nation.

The Administration now is forcing the extension of the Reciprocal Trade Agreements Act for another three years after it expires on June 12. In Congress, it is bucking the combined opposition of old-guard Republicans and powerful Republican-Democratic elements determined to protect home-state industry against competition of low-priced foreign goods made by low-paid workers.

Even the League of Women Voters is conducting surveys at local levels in 40 states to see how business and industry are being affected by foreign trade.

The extension act would give the President authority to reduce tariffs on selected commodities 5 per cent a year for three years from July 1, 1955. Rates on some items could be cut as much as 50 per cent from those on Jan. 1, 1945. Taxes on income from foreign branches and subsidiaries would be set 14 percentage points under the domestic rate to encourage the flow of capital abroad.

The Administration follows the line that our security depends upon strengthening the position of friendly nations through economic alliances. For example, the U. S. will open hearings Mar. 28 on a new trade pact with Japan. One purpose is to keep Japan from slipping into the Communist orbit.

When it desires, it also can evoke an escape clause to aid industries important to defense but hit by foreign competition. The watch industry, which also makes precision instruments, got relief from Swiss imports on July 28.

The program to establish a community of independent but economically affiliated nations is most commendable. But in negotiating with other nations, the Administration has the obligation to eliminate the frustrating restrictions industry encounters in trying to do business abroad. It must avoid making deals that will cripple industry at home.

America's might lies in the strength of its industry and the high morale of its people, not in precarious arrangements with foreign countries.

Irwin H. Such

EDITOR

DATA SHEET NO. 2

INLAND

facts about

LEDLOY*

*Patented Tradename of Inland Steel Company, leaders in development of Leaded Steels.

METAL SHOW VISITORS SEE LEDLOY MACHINED AT 300 SFM

37% faster than the best of other steels!

Hour after hour, a Brown & Sharp automatic screw machine, at the recent A.S.M. National Metal Show, turned out a special screw machine part to demonstrate the superior machinability of Ledloy Steels. The screw machine was set up by Joseph T. Ryerson & Son, Inc., national distributors of Ledloy, to form, drill, tap, thread O.D., knurl and cut off this part.

Ledloy machined this part in 24 seconds.

Throughout the five days of the show, Inland Ledloy Grade A was run at 300 S.F.M. Machining time was 24 seconds per part!

The fastest speed attainable, with comparable tool life, machining this same part from the best of other screw machine stocks was 225 S.F.M., resulting in a machining time of 33 seconds per part.

Ledloy consistently out-performed the best of conventional screw machine steels with an average increased production of 37%!

Ledloy Gives Longer Tool Life

The ability of Ledloy steels to give you more production from your present machinery is only one of their advantages. Ledloy also means longer life for your tools because Inland's patented process of adding lead to steel lowers the steel's friction component. Ledloy actually lubricates the cutting tool during machining, reducing the heat generated and minimizing tool wear. And, because of the lead, Ledloy chips break up into shorter lengths which quickly fall clear of the tool, again reducing friction.

Ryerson demonstrates Ledloy's superiority at Metal Show.

All this means less tool wear and tool edge build-up, longer periods between tool grinds and longer life for your tools.

Although the lead in Ledloy makes it the easiest machining steel you can buy, it does not alter the very desirable qualities inherent in open hearth steel. You can expect from Ledloy the same performance in ductility, strength and heat treating properties that you get with good open hearth steel of comparable chemistry. This means that, using Ledloy, manufacturers of screw machine products and producers of machined forgings can get more product per man-hour, superior machining and finishes without sacrificing all the desirable mechanical and metallurgical properties of open hearth steel.

If your product requires machining, it will pay you to get all the facts on Inland Ledloy. Ask your cold drawn bar supplier about it today, or write Inland Steel Company for an interesting new booklet, "Properties of Inland Ledloy Steels."

world's most machinable steel!

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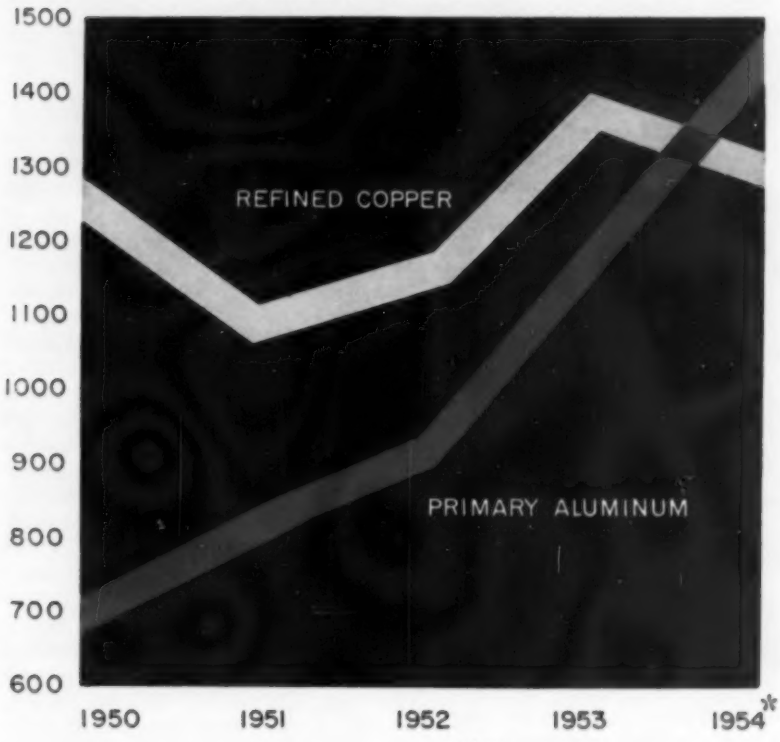
Aluminum Takes the Lead

(Production in thousands of tons)



*Preliminary.
Sources: Copper Institute; Aluminum Association.

It's a matter of simple economics as . . .

Copper, Brass Mills Woo Aluminum

PEACEFUL COEXISTENCE: Stripped of its political undertones, this phrase describes the situation between copper and aluminum. The two metals can exist under a common roof.

That's just what is happening in the copper and brass industry. As Charles A. Macfie, president of Revere Copper & Brass Inc., expressed it: "If you can't beat them, join them." Revere, among others, has found that it pays to "join them."

Courtship of Convenience—The courtship of copper and aluminum was not prompted by love but by economics. It pays. It is no secret that aluminum has been cutting into copper sales in recent years. It is even more evident that the light metal will continue to go places (see chart above). Progressive thinkers in copper and brass companies have convinced top management that it is not only economically feasible to produce both metals but it is also just plain horse sense. Under such a setup a salesman is not handcuffed when a potential brass customer decides aluminum might do the job as well as or better than copper and cost less. The salesman who can offer either product saves his company an otherwise lost sale and at the same time opens up a whole new market.

How well this thinking has taken hold is seen in the table on the following page. Of the 13 copper and brass companies contacted by STEEL, 12 are in the aluminum business to some degree. Only Phelps Dodge Copper Products Corp. claimed not to have any aluminum plans at present.

History Lesson—This development did not spring up overnight. Scovill Mfg. Co., Waterbury, Conn., believes it was the first to fabricate aluminum in this country in 1889. In 1918, Bohn Aluminum & Brass Corp., Detroit, was founded as a producer of both products. Revere has been producing light metal products of one kind or another for about 25 years. In all these cases the main reasoning has been that it's a simple matter of economics.

Most of the aluminum products coming from the copper and brass mills parallel the products originally made there. The reason is simple: They are made on similar, but not necessarily the same, machinery. Most officials point out that the rolling mills in their plants are pretty basic. They also point out that rolling techniques are enough alike that any good copper mill worker can become a good aluminum mill man if given proper training. Because of the carryover of know-how from one operation to the other, this training takes less time than it takes to break in most new men. James F. Ackerman, vice president of American Brass Co. at its Torrington, Conn., plant and in charge of the new Terre Haute, Ind., aluminum plant, says that his oldest and ablest copper mill men take pride in the transition to aluminum and boast of the quality of their work.

Difficulties—Even with this similarity, most persons think it is wise to separate the two operations. They say it is not economical to roll both metals on the same mill unless there is a tremendous pressure for the aluminum products. The cost of changing dies, rolls and lubricants and making other technical adjustments would nearly erase any saving resulting from the use of copper mills. This type operation is advisable only for special jobs and experimentation.

Another difficulty in combining the two operations is the big difference in handling techniques. The differences in weight and bulk between copper and aluminum complicate interchangeability of rolling

mills. In addition there is danger of contamination of one metal by the other.

Exception — In manufactured products, the interchangeability of men and machines is not as difficult as in basic production. Scovill is one of the leaders in this respect. It makes copper and aluminum cosmetic cases, screw machine products, buttons, snap fasteners, eyelet machinery products and many others side by side with little difficulty. But even here, interchangeability is kept at a minimum.

Experience so far has shown that marketing problems have been minor. Generally, the existing sales staff and warehousing facilities have been utilized with the help of a few aluminum specialists.

Boost for Capital Goods—It all adds up to a new market for capital goods producers. Most of the companies indicate their aluminum business is growing, and they intend to keep up with the growth of aluminum rather than be satisfied with a token production. One company hopes to gain a position in aluminum similar to its position in brass. American Brass is spending $25 million on its Terre Haute plant.

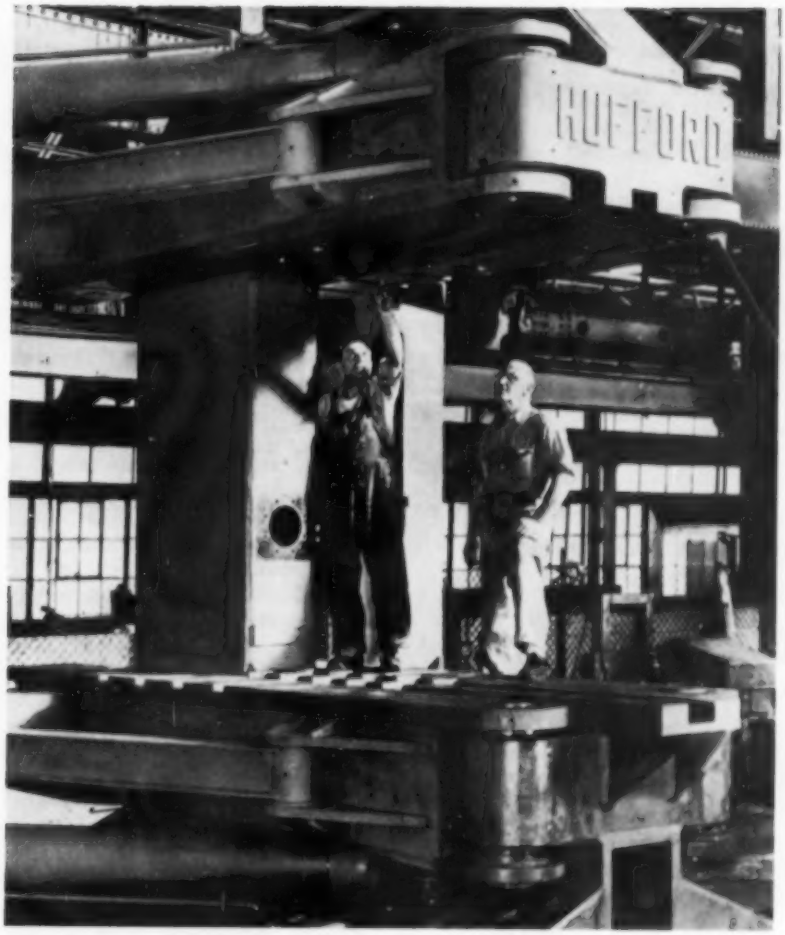
But just how far in this direction will copper and brass mills go? The Bureau of the Census estimates copper and brass mills ship somewhat less than 5 per cent of total wrought aluminum products. Aluminum & Magnesium Division, Business & Defense Services Administration, says it can account for about one-tenth, or 1,546,000 lb, of aluminum tube and sheet shipments by copper and brass mills under Controlled Materials Plan in 1952. That would make a total of about 15.4 million lb for tubing and sheet, not to mention other mill and manufactured products. Another indication of the penetration is the fact that when completed, the Anaconda Copper Mining Co. reduction plant at Columbia Falls, Mont., will produce about 5 per cent of this nation's raw aluminum. It will supply American Brass's needs in Terre Haute, plus all other aluminum operations of the company.

No Threat—Five per cent of a market is not enough to worry the "big three" aluminum producers, most copper men argue. In fact, most of these operations in the brass industry depend on the big three, plus Aluminum Co. of Canada, for their raw materials. No one anticipates the day when competition will prompt those suppliers to cut off their shipments to the copper industry. There seems to be room in this growing market for the volume of sales the brass industry has in mind.

Nor do copper producers feel that the aluminum business will ever replace or even dominate their basic industry. As one copper man put it: "Aluminum is not going to push copper out. In the face of the decreasing metal [according to the Paley report], it is going to help copper meet its requirements more easily." And if there is money to be made by helping aluminum help copper, industry men feel they are businessmen first, copper men second.

Copper and Brass "Who's Who in Aluminum"

Company	Extent to which it has gone into aluminum production
AMERICAN BRASS CO.	Makes small quantities of sheet and tubing at existing plants; planning $25-million aluminum mill at Terre Haute, Ind.
ANACONDA COPPER MINING CO.	Completing 60,000-ton-a-year reduction plant at Columbia Falls, Mont.
ANACONDA WIRE & CABLE CO.	Been fabricating wire and cable since 1948; expanding aluminum operations at present time.
BOHN ALUMINUM & BRASS CORP.	Began operations in 1918 as a producer of both brass and aluminum products, with greater emphasis on aluminum.
BRIDGEPORT BRASS CO.	Produces strip, rod and tube on pilot basis at Bridgeport; has been producing extrusions and forgings in quantity for about a year at Adrian, Mich.
BRISTOL BRASS CO.	Recently bought Accurate Brass Co., producer of brass and aluminum forgings; has considered production of aluminum at Bristol, but has no plans for the future.
CHASE BRASS & COPPER CO.	Has experimented with rerolling aluminum at Waterbury, Conn., plant.
KENNECOTT COPPER CO.	Last year purchased large bloc of Kaiser Aluminum & Chemical Corp. stock; no announcement of any plans to fabricate aluminum.
MUELLER BRASS CO.	Has made rod, extrusions, forgings and screw machine products since World War II.
REVERE COPPER & BRASS CORP.	One of the pioneers in this development; produces coiled sheet, tube, extrusions and forgings; recently bought Standard Rolling Mills Inc., producer of foil.
SCOVILL MFG. CO.	Another pioneer; can trace aluminum fabrication back to 1889; makes sheet and wide variety of manufactured products.
WOLVERINE TUBE, DIVISION OF CALUMET & HECLA INC.	Has been redrawing since 1935; began primary production in 1954; makes drawn and extruded tube and extruded shapes.



National Supply Co.

First quarter, 1955, may be the low point as . . .

Capital Spending Due To Rise

CAPITAL equipment spending may well revive later in the year after touching bottom in the first quarter of 1955. That's the forecast of A. W. Zelomek, International Statistical Bureau Inc.

Mr. Zelomek reasons: Capital spending, on a downtrend since the third quarter, 1953, showed a smaller estimated decrease in the first quarter, 1955, than in any quarter since the slide began. Government estimates put the first quarter, 1955, new plant and equipment expenditures at $6096 million, compared with $6240 million in the first quarter, 1954, and $6339 million, first quarter, 1953.

Time Lag—Since capital spending is always the result of long-term planning, that leveling out effect is from management thinking of two or three months ago.

With business activity on a speed-up in the past two or three months, it's a fair bet that management decisions being made now will boost capital spending later in the year.

Lures for Spending — Industry will be lured into more active re-equipment programs by continued high consumer spending, new emphasis on defense mobilization, need for cost cutting, high-level wage rates, a high rate of research spending (which usually means high capital expenditures to translate new inventions into commercial products) and the provisions of the new tax law.

While a National Industrial Conference Board study indicates the new depreciation methods of the 1954 tax code are being met with mixed reactions almost half of the 167 manufacturing companies contacted were planning to take advantage of accelerated depreciation. Bulk of the respondents to the NICB query indicate that the fast depreciation methods will stimulate capital expenditures for modernization rather than for expansions.

Reasons cited by the 45 per cent of respondents to the NICB survey for changing to accelerated depreciation included more rapid recovery of capital funds, reduction of current taxes, and more realistic valuation of assets.

Reasons given by the 35 per cent of respondents who didn't change to accelerated depreciation included the fact that their value of new equipment was too small to make the shift worthwhile, apprehension over Internal Revenue Service's interpretation of parts of the 1954 tax code, equipment not adapted to fast depreciation and satisfaction with the straight-line method.

The remaining 20 per cent of responding companies indicated their decisions awaited studies of matter currently being made.

Many of the companies which did not change to accelerated depreciation indicated that they will continue to watch the tax structure and may exercise their option to switch later. In a few companies accelerated depreciation has been adopted on a limited scale only. Some companies say they may avail themselves of accelerated depreciation when their emergency facilities are completely written off.

Still High and Mighty—The record year for capital expenditures (STEEL, Nov. 8, 1954, p. 37) was 1953 ($28.4 billion). Runner-up was 1954 (about $27 billion). This year could be a shade under those two and still be good.

One final word from Mr. Zelomek: Total expenditures for 1955 may be fractionally lower than they were in 1954, but some industries plan to increase their capital spending. They include the non-electrical machinery, electrical machinery, transportation equipment, clay and glass products, petroleum and coal products, mining and commercial industries.

***Companies with plans in operation experience these* PROFIT SHARING RESULTS**

- Up to 40% increase in production per employee.
- Reduction in labor turnover, absenteeism and tardiness.
- Better care of company equipment.
- Fewer labor grievances.
- Improved quality of product.
- Decrease in material waste and product rejections.
- More and better employee suggestions.
- Increase in number and quality of applicants for employment.

Source: Council of Profit Sharing Industries

Employees in 8000 companies work to prove that . . .

Profit Sharing Gets Results

OVER $235,000 ($91,000 cash, the rest in common stock) was distributed to 850 McCullough Tool Co. employees last December.

A handout or philanthropic gesture by the Los Angeles company? Definitely not. It represented the employees' portion of funds from the firm's profit sharing program.

It Grows and Grows—Last year, over 2000 companies filed profit sharing plans with the Internal Revenue Service, bringing the number of such programs in the nation to about 8000. The increase demonstrates the interest business and industry are showing in profit sharing. Whether viewed from an idealistic approach or as hard-headed business, the programs are paying off (see checklist).

What's involved in profit sharing? The key consideration, proponents point out, is *how much of your profits are you going to share?* The range is tremendous, says the Council of Profit Sharing Industries (CPSI), Chicago. It may vary from 5 to 50 per cent before taxes. The typical cut is about 20 per cent.

Considerations—Two guides to whether you should have profit sharing and how big a cut you should give are: 1. The amount each employee gets should be large enough to stimulate his active support of the program. 2. Most feel that the program can and should pay its own way in the long run. To an employee earning $4000 a year, a $25 share isn't going to put much fire under him to make company profits grow. Programs today, according to the CPSI, range from 5 to 100 per cent of the employee's annual earnings. The average: About 10 per cent.

Various Types—The second key consideration should be *what kind of a plan is it going to be?*

1. Cash: This plan—monthly, quarterly, semiannual or annual payments—has certain advantages. Employees get immediate payment and can do what they please with the money. Results from this type plan often can be felt more quickly in company operations because the benefits are immediate.

2. Profit sharing trusts: This generally is held for pension-type payment or cash distribution upon severance, death or retirement. Advantages: Even in years the company does not make a profit, benefits are distributed through retirement, death, etc. Earnings are also realized from outside investments. Both company and employee gain tax advantages—money deposited with trusts is not taxed (undiminished fund can also earn interest which is tax exempt) until it is distributed.

3. Combined cash and trust: This incorporates both plans. A company can also operate both plans individually as does Electronic Engineering Co. of California. EECO has had a profit sharing retirement system for two years and recently installed a quarterly cash profit sharing system. If the company's pretax net profit on sales exceeds 4.5 per cent, a cash bonus is paid to all employees with two or more years service. Payment is keyed directly to the increase in net profits and may reach as much as 20 per cent of the net profit figure.

Employees Pay—One school of thought originating in the Chicago area is a profit sharing system which is tied in with contributions by employees. Two examples are Motorola Inc., Chicago, which put its profit sharing into operation in 1948, and Camcar Screw & Mfg. Corp., Rockford, Ill.

Both companies contribute 20 per cent of net profits to a trust, and participating employees must contribute up to 5 per cent of their earnings but no more than $200 annually.

Two Approaches — Participation in profit sharing is required at Motorola, but it's voluntary at Camcar. Individual cuts in the company profits at Camcar are based on the employee's earnings and years of service. At Motorola, the share is based on how much the employee contributes. Kenneth Piper, Motorola director of human

relations, says that 99 per cent plus contribute the $200 maximum annually.

There are three other important factors in profit sharing: Administration, legal and financial considerations. Joseph B. Meier, CPSI executive secretary, says that the partnership concept of profit sharing makes joint employee-management administrations desirable. All deferred trust plans should be approved by the Internal Revenue Service. If the trust fund type plan is used, the problem of how to invest the money properly must also be considered.

Trusts Mushroom—How big can profit sharing trusts get? Motorola's experience since 1948 can give you an idea. At the end of 1948, the trust showed $1.9 million; 1949, $3.9 million; 1950, $7 million; 1951, $10.5 million; 1952, $14.5 million; and 1953, $17.6 million. When 1954's total is announced, the figure will probably hit between $22 million and $23 million.

With totals like that, you can bet that Motorola's 11,000 employees do not consider profit sharing just a company gift to look forward to each year. It's money in the bank which they have to work for.

*** You do not just start profit sharing and forget about it.**

Three cartoon characters, Professor Sharin and Johnny and Mary Motorola, do a great deal of merchandising for Motorola Inc. The "prof" and his two helpers show up everywhere: 1. On letterheads from President P. V. Galvin and Mr. Piper, explaining the profit sharing system to new employees who must wait a year to participate. 2. At the annual announcement of the amount of money the company is contributing to the trust fund. 3. In shop displays which relate profits to scrap losses. Current scrap losses are shown in dollars and cents to demonstrate how scrap losses cut down profits. 4. On the pamphlet explaining the company suggestion program and how it too is connected directly to profits. 5. On annual company reports to employees showing the company business picture for the year.

Automation: No Monster

Benjamin F. Fairless says: "Human beings will never become obsolete"

A CAMPAIGN, calculated to discourage and retard the technological progress of our country, is being conducted through the psychology of fear. This campaign, says Benjamin F. Fairless, chairman of the board, U. S. Steel Corp., is designed to frighten our people into believing that new machines being developed will destroy the jobs of thousands and leave them destitute.

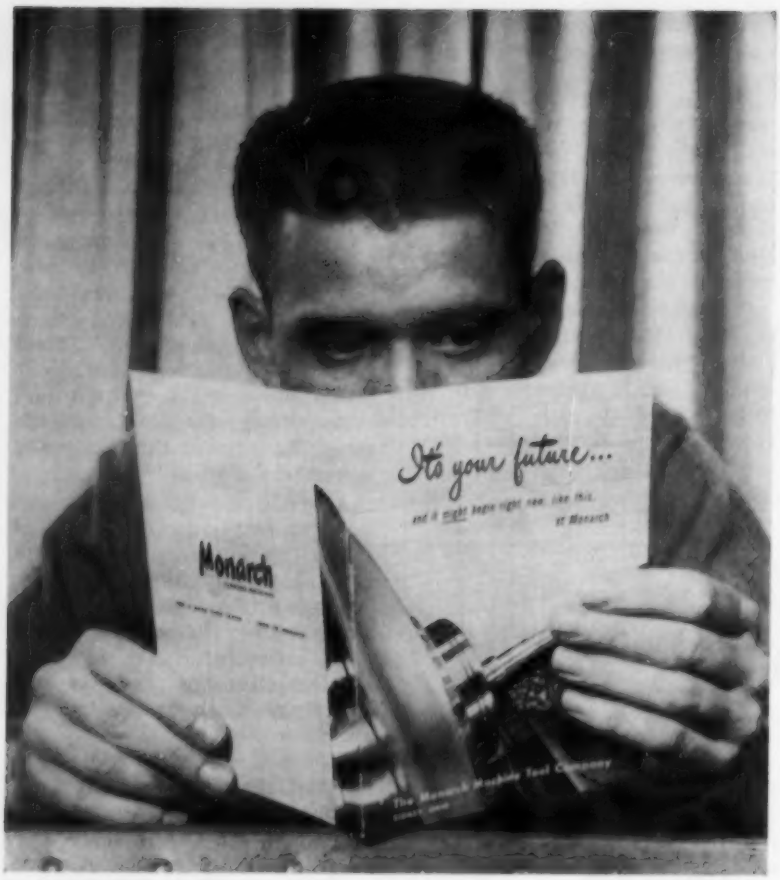
Automation — Referring specifically to automation, Mr. Fairless says: "To all the people who do not understand its meaning, it suggests a brand new class of machines—different from any we ever had—and so superior to man himself that ultimately they may rise, like Frankenstein, to destroy us all. These fears are just plain silly."

"This thing called automation is simply evolution, not revolution," states Mr. Fairless. "It is only another little step in the slow and plodding progress of man toward a richer, fuller life and a better, freer world. Over the centuries man has accomplished an amazing industrial miracle. He has surrounded himself with luxuries and greatly lengthened his hours of leisure; but no machine ever devised has made humans obsolete."

From 1939 through 1953, Mr. Fairless points out, the population of the U. S. increased 22 per cent. The number of jobs has grown by 35 per cent—or more than half again as much. In the field of manufacturing itself, where automation has advanced most rapidly, employment has gone up 73 per cent, or more than three times as fast as the population.

Progress — Mr. Fairless quotes the late Philip Murray, who stated: "I do not know of a single, solitary instance where a great technological gain has taken place in the U. S. that has actually thrown people out of work."

"This statement was never truer or more timely than it is today," states Mr. Fairless.



Starting pay for the tyro engineer rises as . . .

Firms Bid High for Graduates

STARTING WAGES for graduate engineers keep rising. For the June graduate, average starting pay will be about $365 a month.

Northern Ohio manufacturers, reporting to the Associated Industries of Cleveland, show they are paying a high of $390 a month, a low of $350. A year ago the average starting salary was about $350 a month, with the high being $375, the low $305. Postgraduate students receiving their M.S. degree this June are being offered about $440 a month, compared with $385 a year ago.

The Reason—Experts state that there is an annual need for 30,000 graduate engineers. The nation's engineering graduates totaled 19,000 in 1954. A total of 22,000 will be graduated from the class of 1955, but military requirements will reduce this total.

A majority of the companies are offering $20 a month raises at six month intervals during company training programs, which generally last from 6 to 18 months. Others offer: A $35 increase after one year; 10 per cent increases at the end of one year and $25 increases after nine months. Several companies are giving raises on merit only. The remaining companies, in most cases, break down into two groups: 1. Automatic increases up to one year. 2. Periodic raises up to 18 months.

Scramble for Graduates — The demand for certain types of engineers—aeronautical, instrumentation and nuclear—is particularly critical. Thus, the annual recruiting scramble is extremely competitive.

AIC reports that at one engineering school, recruiting began Nov. 15, 1954, and will continue through March 31, 1955. In the interest of the graduate's time, the number of companies who may send representatives to this campus is limited to 250. The graduating class numbers 200.

Help Needed—While graduates are being "wooed and won," undergraduates who are in need of part time work have tough sledding. College placement directors report that dropouts (students leaving college because of insufficient funds) are rising rapidly. Any loss by universities and colleges of students will ultimately represent a loss to business and industry of good potential material for engineering staffs.

Better Employees — Case histories from industry and business show that among the best employees (from a company standpoint) recruited from colleges are those who obtained all or part of their formal education through individual efforts—by working on a part time basis.

The graduate engineer, a most eagerly sought commodity, can afford to make a careful choice of employer. He may well hold this advantage until the 1960s.

Drop Forgers: '55 Up

"One feels mighty chipper about the current trend of the broad business indicators," so stated James M. Dawson, vice president and economist, National City Bank of Cleveland, at the annual winter meeting of the Drop Forging Association.

Members also pointed out: There has been an upward trend since the fourth quarter of 1954. Consumer inventories have been worked off to normal level. And indications point to high activity in the automotive industry and in the building and highway construction field.

Edgar L. Harden was named executive vice president, secretary and treasurer of the association, succeeding Raymond M. Seabury who is retiring.

Ready for the Future

Automakers spent $1.35 billion in 1954 for modernization and expansion

THE AUTOMOTIVE industry is putting heavy money on the line that the country is entering a period of growth and prosperity.

Auto builders poured $4.6 billion into an unparalleled expansion and modernization program from 1951 through 1954. Last year they spent a record $1,350,000,000 for capital goods, not including special tooling.

Not To Keep Even—Not all of that money went into the competitive race to maintain industry positions. Much of it was spent in anticipation of larger industry-wide sales. Consensus of forecasts is that new car and truck registrations will climb from 1954's record total of 58 million to 64 million by 1960.

A year-by-year comparison of capital expenditures by the automotive industry shows clearly the accelerating growth trend: In 1950, $510 million was spent; in 1951, $851 million; 1952, $896 million; 1953, $1 billion; 1954, $1.35 billion.

All In—All sections of the country shared in the tremendous growth of automobile production facilities. The latest in manufacturing techniques and materials handling equipment will be found in new automotive plants. Nearly all companies in the industry have participated in the expansion, too. Ford Motor Co., as only one example, has spent $1.4 billion in the last 8 years and will have spent $1.7 billion when its present planning is completed.

Automakers are in one of their strongest positions ever to capitalize on what they believe will be an expanding market.

Unemployment Insurance Boost

President Eisenhower's recommended improvements in the unemployment insurance program are being acted upon by 29 of the 48 states, reports Secretary of Labor James P. Mitchell.

In Rhode Island, Idaho, Vermont and New Hampshire legislation increasing benefits has been formulated. Governors in Rhode Island and Idaho have signed the bills. In Vermont and New Hampshire, bills are before the governors for signature. Average amount being sought in maximum weekly benefit is $6. Largest amount is $13 (Illinois). The smallest is $2 (New Hampshire and Nebraska).

Peekskill Gets Atomic Plant

The second atomic generating plant being built in this country will be able to supply a city of 250,000 with power. The new plant (capacity, 125,000 kilowatts) will be constructed at a site near Peekskill, N. Y., by the Consolidated Edison Co. of New York Inc.

In telling the Joint Committee on Atomic Energy about the project, H. B. Searing, president of Consolidated, stated that the plant will be built with private funds. Construction will take four years.

The first plant capable of producing commercial power with atomic fuel, the Duquesne Light Co.'s installation, is partially owned by the government and is being erected near Pittsburgh. Upon completion, it will produce about 60,000 kilowatts.

These New Bills May Affect Metalworking

Among new bills of interest to industry introduced in the 84th Congress are the following:

H. R. 3949, by Rep. Walter (Dem., Pa.), to make "good faith" a complete defense against antitrust proceedings based on price, service or delivery. House Judiciary Committee.

S. 1017, by Senator Dworshak (Rep., Idaho), to extend Renegotiation Act which expired last Dec. 31 to Dec. 31, 1956. Senate Finance Committee.

H. R. 3890, by Rep. Curtis (Rep., Mo.), to encourage private plans for benefit in lieu of Social Security. Ways and Means Committee.

S. 1003, by Senator McClellan (Dem., Ark.), to put Congress on record as favoring a federal policy of noncompetition with private business. Senate Government Operations Committee.

H. R. 3906, by Rep. Laird (Rep., Wis.), to provide rapid tax amortization for facilities to abate air and stream pollution. Ways and Means Committee.

H. R. 3901, by Rep. Hiestand (Rep., Calif.), to provide federal housing loans to reduce air pollution. House Banking and Currency Committee.

S. 1032, by Senator Potter (Rep., Mich.), to authorize deepening channels of the Great Lakes above Lake Erie. Senate Public Works Committee.

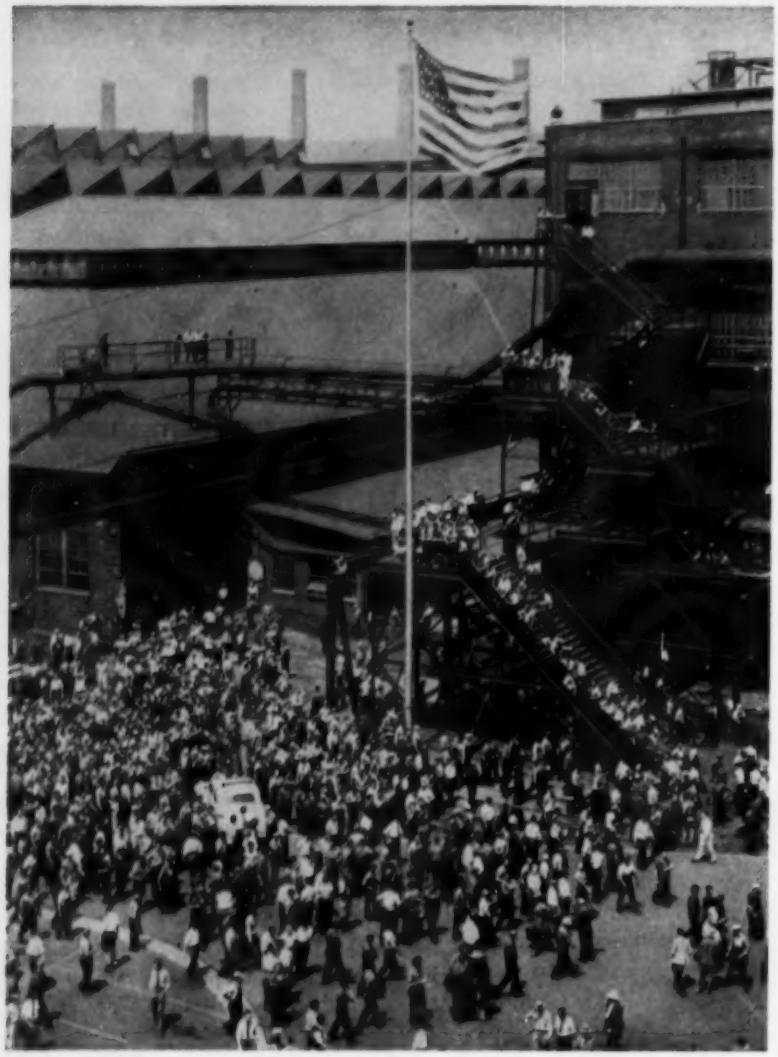
S. 6, by Senator Capehart (Rep., Ind.), to grant five New York public utilities companies the right to develop power at Niagara.

S. 1049, by Senator Gore (Dem., Tenn.), to authorize the Atomic Energy Commission to build an experimental electric power plant based on atomic fuel. Joint Committee on Atomic Energy.

H. J. Res. 179, by Rep. Hyde (Rep., Md.), to authorize research to uncover new uses for coal and its by-products.

S. 11, by Senator Kefauver (Dem., Tenn.), to overturn the Supreme Court decision in the Standard Oil case by providing that good faith shall be a defense against charges of discrimination unless the effect of the discrimination may be substantially to lessen competition or tends to create a monopoly in any line or commerce.

By E. C. KREUTZBERG Washington Editor



GE's court case is the precedent . . .

"Security Risks" Can Be Fired

EMPLOYEES who admit they are Communists or those who hide behind the Fifth Amendment can be fired. General Electric Co.'s court case is the precedent.

History—GE, like other defense contractors, had excluded or removed from classified defense work all workers designated as security risks by the government. The government does not supply the employer with evidence to back its findings. General Electric could not establish whether an employee was a "security risk" because he was a disloyal citizen or whether he was deemed one for reasons not reflecting on his loyalty. A "security risk employee" can be one who must be denied access to classified information because of drinking or talking too much, or because he might be subjected to subversive pressures through threats to relatives behind the Iron Curtain.

First Break — When numerous employees began to hide behind the Fifth Amendment during the McCarthy subcommittee meetings in November and December, 1953, and January, 1954, GE decided to act.

The company felt it was in a position to adopt a firm policy: 1. Fire any employee who admitted being a Communist, or engaged in any form of espionage or sabotage. 2. Suspend for 90 days any employee invoking protection of the Fifth Amendment. 3. Discharge this employee if investigation revealed he was not entitled to reinstatement.

Repercussions—In line with this policy, GE fired 24 workers and was immediately sued by the independent United Electrical Workers and the CIO. They claimed the firings violated the collective bargaining contract.

The suit came to trial before Judge Charles F. McLaughlin last November in the U. S. Court, District of Columbia. On Dec. 30, 1954, Judge McLaughlin handed down his decision, stating: "The Fifth Amendment does not guarantee that a person who invokes it will not be subject to an unfavorable inference. The court concludes that it likewise does not guarantee the person who invokes it shall be continued in his employment."

Others Follow Suit—A few days after this decision, Westinghouse Electric Corp. fired five employees from its East Pittsburgh works. Westinghouse described these workers as: "Undesirable employees whose left-wing activities and associations have brought discredit upon Westinghouse and its thousands of loyal employees." Other employers are following suit.

Future—Justice department officials are preparing to ask Congress for legislation which will authorize the President to keep potential subversives out of defense facilities altogether, barring them even from work on nonclassified projects.

Labor spokesmen oppose such legislation, contending that dismissal of "mild risks" from nonclassified jobs is not essential to the national security.

NO. 30 OF A SERIES

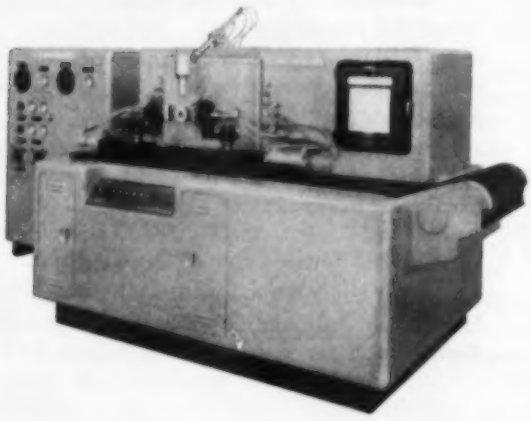
what's new?

the growing versatility of the standard flamatic hardening machine

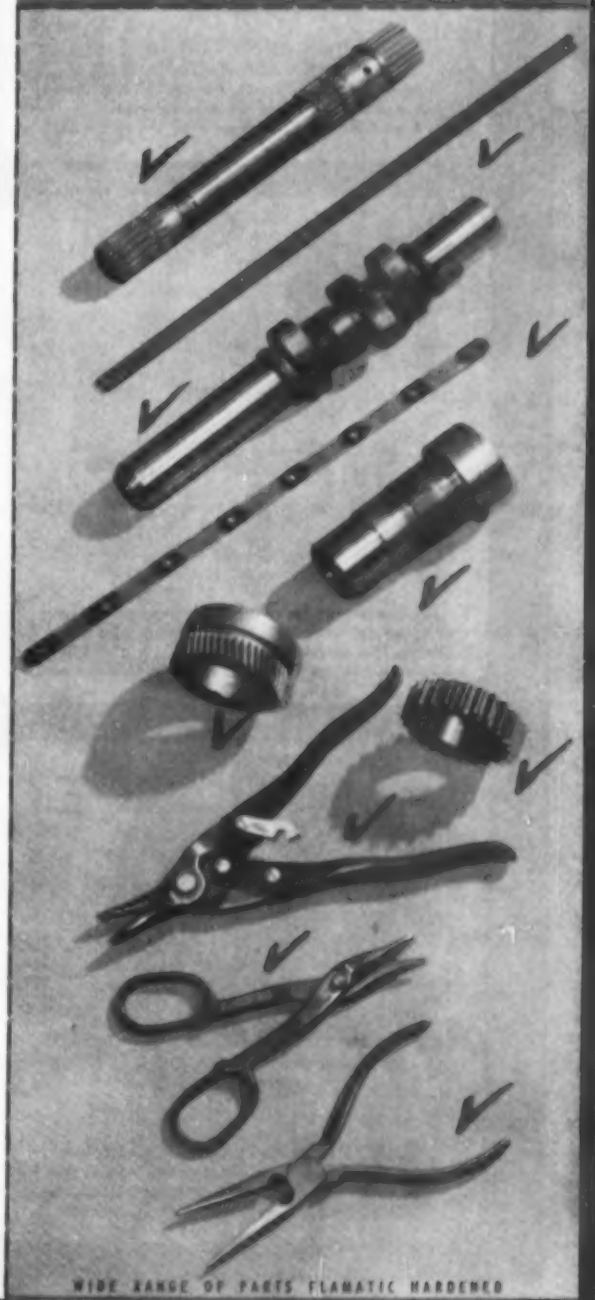
Put two automotive timing sprockets (part shown top right) on a standard Cincinnati Flamatic hardening machine, push the button, and in a few seconds they've automatically dropped into the conveyorized quench tank. Exclusive Flamatic electronic control holds temperature so close that the hardness pattern and value are uniformly maintained. Material: S.A.E. 1146 steel. Production rate: 200 parts per hour. Operations automatic except for loading. Rejects nil.

A surprisingly wide range of parts can be hardened in production on standard Flamatic machines with fairly simple tooling and easy changeover to new jobs. Maintenance is practically no problem, and you can use any fuel gas.

Write for the new Flamatic Catalog: Publication No. M-1861.



AUTOMOTIVE TIMING SPROCKET



WIDE RANGE OF PARTS FLAMATIC HARDENED

CINCINNATI **flamatic**

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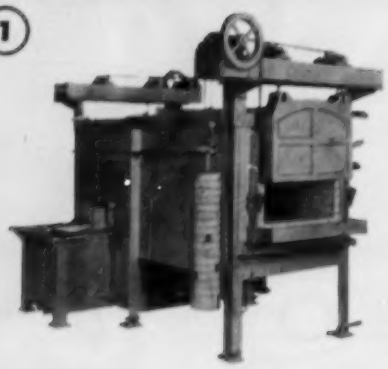
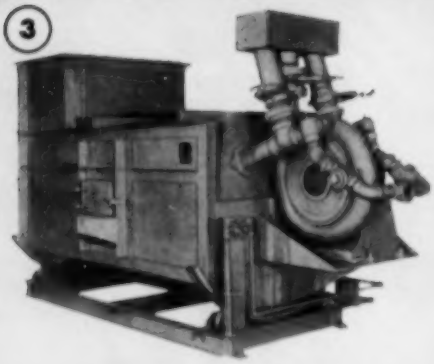


B&W Allmul forms the durable lining in this Eclipse, two side dip out, gas-fired, 1000-pound-per-hour, dry hearth reverberatory furnace for aluminum and aluminum alloy die cast work.

Another furnace made by the Eclipse Fuel Engineering Co. of Rockford, Ill., with B&W Allmul lining. This model is similar to the one above but is of straight-through design instead of side dip out.



B&W Allmul in this tilt-type, gas-fired Eclipse reverberatory furnace for melting iron, brass or aluminum, is subject to melting temperatures of 3000F at the arch and 2800F in the bath.

Eclipse

Eclipse Fuel Engineering Co. Uses

B&W ALLMUL FIREBRICK

for Tough, High Temperature Service

The hard, dense structure of B&W Allmul . . . its high melting point, 3335F . . . its resistance to spalling . . . low and uniform reversible thermal expansion . . . exceptional volume stability . . . high hot load strength and slag resistance all help to make it an ideal refractory for furnace linings subject to tough service.

Because B&W Allmul is volume produced from electrically melted grain by a highly efficient process, this top quality mullite brick is practical, from a cost standpoint, for a wide range of applications. For instance: butt welding furnaces, billet heating furnaces, electric furnace roofs, and reverberatory melting furnaces, to name a few.

May we submit detailed information? Ask your B&W Representative, or write requesting Bulletin R-34.

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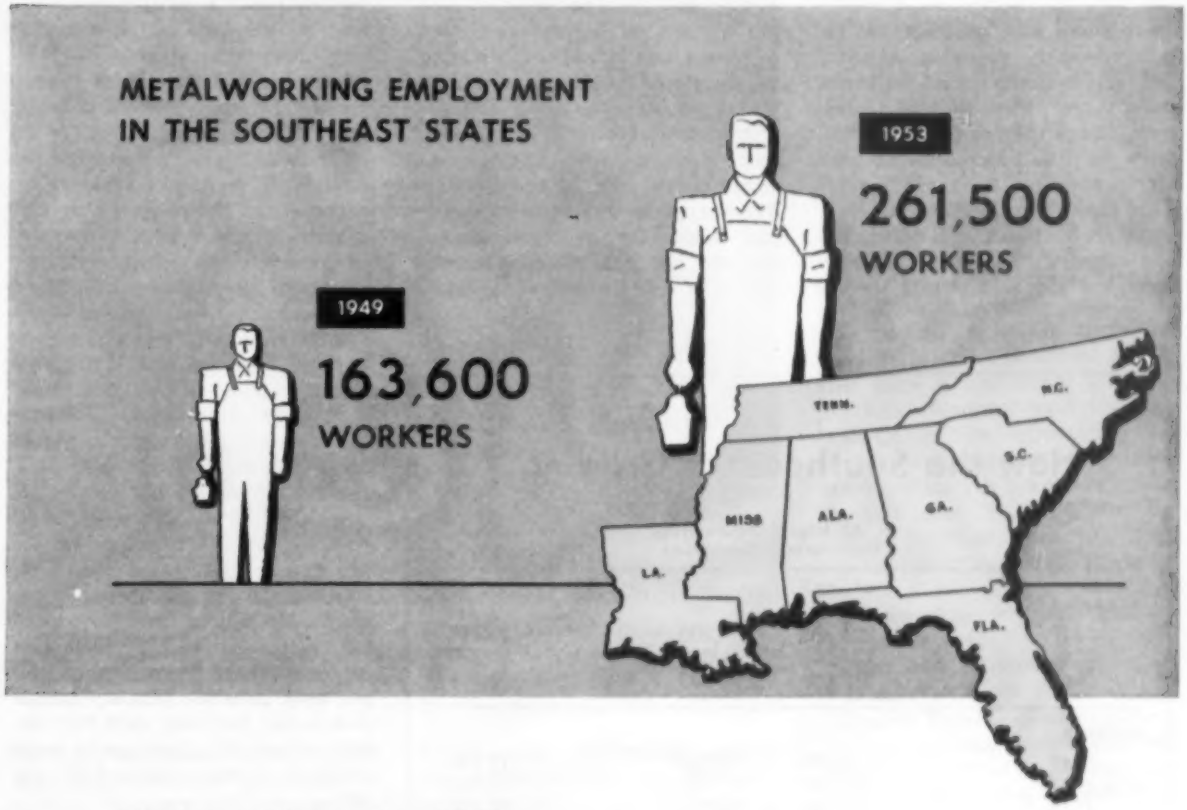


Employment jumps since 1949 as . . .

Metalworking Moves Into Southeast

CHARLES SILVERS' Adams Engineering Co., Ojus, Fla., grosses more than $5 million a year. The company makes extruded aluminum jalousie windows and furniture, and employs more than 300 people. Six years ago, it was operating out of the back of a laundry with six assistants.

You'll find many Charles Silvers stories among metalworking companies in the Southeast states. They don't owe a thing to Paul Bunyan braggadocio. They're based on hard economic fact. Right now, the Southeast offers a big enough mass market to support many more metalworking companies than it has. It is particularly short on secondary fabricators.

Metalworking on the Move—Between 1949 and 1953, metalworking employment jumped from 163,600 to 261,500 in the eight Southeastern states. The odds are it will keep moving up. A check of the U. S. Bureau of the Census reports for consumption of metals by states indicates that.

Alabama, the heaviest consumer of alloy and stainless steel, copper and aluminum among the Southeastern states, used only 3 per cent of the national figures for these metals in 1952. South Carolina was low, with 0.08 per cent of the national totals. Mississippi was not much better off with 0.13 per cent. Florida, Georgia, Louisiana, North Carolina and Tennessee fall in between. Iron and steel processing and fabrication employ 11.64 per cent of production workers in the south, compared to 37.67 per cent for the nation as a whole.

Patterns — The Southeast has been traditionally rural and agricultural. Its agriculture has made relatively little use of machinery and other metalworking products. With the exception of the petroleum industry in Mississippi and Louisiana, which has recently used millions of tons of pipe, tubing and plate and oil field supplies, the degree of industrialization also has been quite low.

Relatively low incomes have limited the market for durable consumer goods. Finally, the south has been overshadowed by the metalworking giant in the area north of the Ohio and east of the Mississippi. This area has a head start on industrialization, with the advantages of short distances to the most concentrated markets of the nation.

The Results—Alcoa's Knoxville, Tenn., plant ships 95 per cent of its production out of state for fabrication. It's cheaper to ship the raw sheet to fabricators who sell locally than to fabricate near the mill and ship finished products. One Southeastern company makes

brake shoes and housings for an auto assembly plant in Atlanta, Ga. But it doesn't send its brake shoes there. First they go to Detroit, where they're put into complete axle subassemblies on the high-production lines for reshipment back down to Georgia.

Robert S. Lynch, president, Atlantic Steel Co., Atlanta, Ga., comments: "The fact is that we are not as well off in the production of metals and in metal fabricating as we ought to be. In food, tobacco, textiles, chemicals and petroleum-coal products, the Southeast is in excellent shape, compared to the rest of the country. We are on the way to being a supply house for hydrogen bombs, but we are out of balance with the rest of Uncle Sam's estate when it comes to metal, particularly finished metal products."

Imbalance—By standard industrial classifications, while Georgia had 3000 companies in lumber in 1953, there were not enough to tabulate in electrical machinery or instruments. There were only 700 in primary and fabricated metals, machinery and transportation equipment combined. Georgia's total income from textiles alone was $422 million, from the metalworking classifications, $197 million.

However, this imbalance puts out the welcome mat for enterprise. Between 1945 and 1953, South Carolina companies pledged more than $22.5 million in metalworking's future. Louisiana, whose primary and fabricated metals industries' total production was worth $16 million in 1939, upped output to $87 million by 1953. This increase breaks down into an 1833 per cent gain for primary metals and a 292 per cent gain for fabricated metals. Comparable gains in the U. S. were 315 and 305 per cent.

Movement—The situation is dynamic rather than static. Based on growth of metalworking between 1949 and 1953, the table at left shows that by 1965 the industry may have more than tripled its strength in the Southeast.

Population totals for the Southeast are running up above 25 million. In Florida the head count was 2,729,000 in 1950. By July, 1954, its population had risen to 3,436,000 for a 25.9 per cent increase. It's estimated that Florida's population will be 4.7 million by 1965.

Markets—North Carolina, with the biggest population of the Southeast states (4,230,100), presents an important market area. It is within overnight travel of more than 30 million people—a market of over $85 billion a year when manufacturing and retail sales are totaled.

Marketwise, movement from farm to city is also important, since many metalworking products depend on mass urban markets. If Oklahoma, Arkansas and Texas are considered with the eight Southeast states, the area contained 100 cities in 1950 having more than 25,000 inhabitants. From 1900 to

How the Southeast Is Growing

State	All Mfg. Employment	Metalworking Employment	Metalworking vs. Mfg. Employment
ALABAMA			
1949	206,400	59,200	28.7%
1953	234,200	71,000	30.3%
1965	317,600	106,400	33.5%
FLORIDA			
1949	90,800	10,100	11.1%
1953	121,400	21,300	17.5%
1965	213,200	54,900	25.8%
GEORGIA			
1949	263,600	20,200	7.7%
1953	311,800	40,200	12.9%
1965	456,400	100,200	22.0%
LOUISIANA			
1949	137,200	10,700	7.8%
1953	156,300	23,200	14.8%
1965	213,600	60,700	28.4%
MISSISSIPPI			
1949	74,300	3,200	4.3%
1953	94,600	9,900	10.5%
1965	155,500	30,000	19.3%
N. CAROLINA			
1949	387,100	16,900	4.4%
1953	438,700	28,300	6.5%
1965	593,500	62.500	10.5%
S. CAROLINA			
1949	199,500	3,200	1.6%
1953	222,900	5,100	2.1%
1965	293,100	15,500	5.3%
TENNESSEE			
1949	236,000	40,100	17.0%
1953	291,400	62,500	21.4%
1965	457,600	129,460	28.3%

Estimated by STEEL

Lockheed Aircraft Corp.'s B-47 plant at Marietta, Ga., spreads a $52-million annual payroll over 36 counties. In its first year of operation, local firms gained more than $14 million in business. It employs more than 12,000 people

1950, the population of those cities increased more than eight times as fast as the area's rural population.

Agriculture—Those who do stay with the farms are steadily improving their worth as metalworking markets. In North Carolina, second of all states in the number of electrified farms, more than 90 per cent are served by central station electricity—a marked contrast to the 3.2 per cent with similar service in 1935. Between 1930 and 1948, the south upped its share of total national electricity generated from 13.2 to 18.7 per cent. Other expansions have taken place since.

Electrification—Farm electricity will provide powerful stimulus to sales of metalworking products. Water tanks, pumps, electric motors, washing machines, water heaters and television sets are just a few. Since 1900, the south has increased its investment in farm machinery and implements from $750 million to more than $5 billion. As for spending money, in 11 years the value of Georgia's agricultural production jumped from less than $200 million to more than $600 million.

There are many other aspects of the Southeast metalworking market which hold out promise. Retail sales, purchasing power, construction volume and transportation industries are all booming at close to or better than national levels. The Mississippi river is an unparalleled highway for bulk shipments. The port of New Orleans did $1.5 billion in foreign trade in 1952, second only to New York.

Promotion—Operating on the principle that nobody will hear about you if you don't tell them and sell them, all the Southeast states have thorough campaigns to bring in new industry. Notably in Mississippi and Louisiana, where metalworking companies can get their plant built for them by the community in which they plan to locate, legislation (Balance-Agriculture-with-Industry, Mississippi) is favorable to relocation.

And Southeast industries are backing up Southeast states. Foundries are co-operating to provide facilities for research and training in foundry practice at the University of Alabama. Machine shop training is being given in 11 North Carolina cities, and the state is training more than 3500 apprentices.

Industry Answers—This combination of improving market conditions and energetic promotion is registering success in attracting industry. In turn, new industry opens the door wider for more to follow.

Take a look at some recent primary metalworking expansions:

Money Talks—Led by Tennessee Coal & Iron Div., U. S. Steel Corp., steel, iron, coal and related industries have spent more than $65 million for new production facilities around Birmingham, Ala.

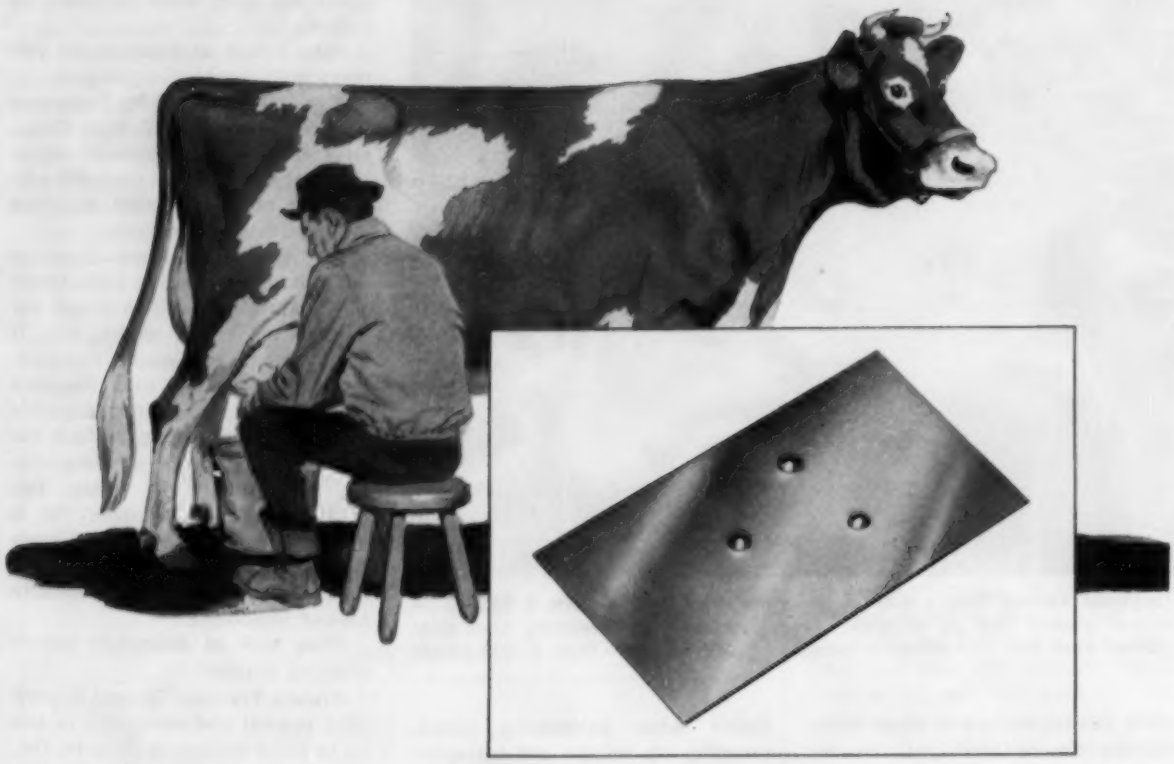
For the Fabricators—Republic Steel Corp. is planning installation of a cold-rolling mill to round out its pipe plant at Gadsden, Ala. It also plans a continuous galvanizing line. Working with National Lead Co. in Birmingham, Republic is also developing new methods for concentrating the low-grade southern iron ores. C. M. White, Republic's president, remarks: "It is our hope that we can do the same kind of a job on these ores that has been done with the taconite ores of Minnesota."

Then look at secondary metalworking expansions:

Growth Trends—General Motors' 1952 payroll and expenditures add up to $36.6 million in Atlanta, Ga., Ford's to $6 million. Combustion Engineering Co., Chattanooga, Tenn., got the boiler contract at the TVA's Gallatin steam plant. General Electric will make clocks in Athens, Ga. Sperry Corp. will make electronic tubes at Gainesville, Fla. Norton Co., International Harvester, Holley Carburetor Co., Yale & Towne, Borg-Warner and Avco Mfg. Co. are just a few of the other names in the Southeast's growing roster of metalworking blue bloods.

There's room for many more. Substantial chemical industry development in Tennessee and other states indicates a potential market for pumps, valves and recording apparatus. The booming textile industry opens the door for electrical motors. At last count only 1 per cent of the Southeast's production workers were employed in the electrical manufacturing industry.

Opportunities—Fabricated wire products, metal stampings, cutlery, hand tools, aluminum kitchenware, air-conditioning apparatus, are some of the other secondary fabricating areas where right now there are opportunities like the one Mr. Silvers saw and took in Miami six years ago.



The bumper mount and the 3-legged stool

A case history of interest to any manufacturer who uses flat-rolled steel.

A little piece of steel like that shown above serves as an automobile bumper mount. Originally, this mount was to be projection-welded to the bumper at each of four points. But during the welding process, at the supplying manufacturer's plant, one point of the mount either refused to take the weld, or it broke easily under strain.

Time was running out. Production lagged and costs skyrocketed. And then a Great Lakes Steel Technical Service Representative was called in. He discovered that, regardless of how flat the rectangular mounting might be, it was virtually impossible to get a strong projection weld at all four corners. But when he eliminated one weld, the plate snuggled into the bumper and made perfect contact on three points—just like a three-legged stool! Three welds were actually stronger than four.

Solving problems is a tradition at Great Lakes Steel. As specialists in flat-rolled products, Great Lakes has had to come up with the right answers to problems in many fields. It will pay you to take advantage of this reservoir of experience next time you have a problem that concerns flat-rolled steel.

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As Chevrolet's new V-8 engine plant begins to roll . . .

Segmented Automation Gets Boost

"SEGMENTED AUTOMATION"—the use of banked parts between automated machines—will probably take a place in the lexicon of modern manufacturing.

Coined by Chevrolet's General Manager T. H. Keating, segmented automation stands in partial opposition to the basic automation concept: Many machines joined together as one through materials handling links. As long as all machines are running, the flow between machines is automatic and the segmented feature appears but a nuance.

Banking—Segmented automation finds its genesis and justification in the fact that you can't keep all of the spindles running all the time. Thanks to the banks between segments and provision of space and handling equipment to feed from the banks, only the affected segment goes down. Other machines continue to build up a bank ahead of the down machine, while machines ahead of it draw from the banks already built up.

In this respect, Chevrolet's new V-8 engine plant in Flint is an interesting continuation of the company's philosophy: Plenty of duplicate capacity to keep that voracious line filled. The new V-8 automation segments combine previously individual operations into clusters, but each cluster is still thought of as an individual machine which can be down without stopping the flow of the line.

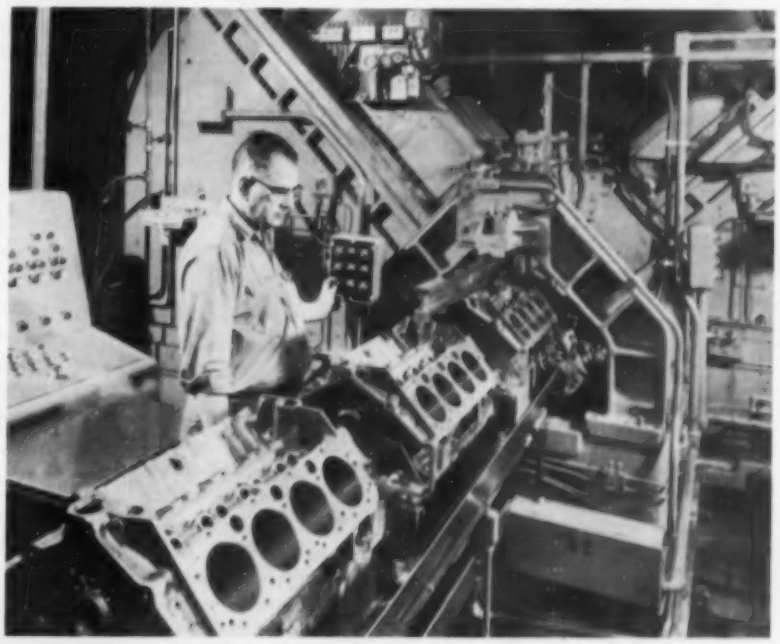
More Advantages — This provision for space between segments also has another advantage. More stations can be added in the event of engineering changes in the engine without uprooting the entire line. Inspection stations can be added where desired without displacement of machines. And, in the tryout stages of the plant, diversion routings to alternative standard equipment by temporary roller conveyor are also being used.

With the plant in its ultimate form, four U-shaped engine block lines over 1100 ft long will provide parallel facilities by which production can be diverted in case of extended trouble with a given segment.

Equipment on the line is ultramodern. A Cincinnati block broach takes the crankcase pan rail and half-round main bearing lands on the first stroke, rolls the block over and does the top of the block and the block head surfaces. This replaces about nine milling machines in capacity, and the amount of work being done can be gaged by the fact that ten motors of 50-hp each supply the hydraulic actuation. Three such machines will match the capacity of the four block machining lines which will be rated at 280 engines an hour.

Stations and "Segments"—Each line consists of nine "segments" or basic automation machine groups with a bank between each one. There are 121 stations on the line to take care of the block and 550 spindles work on each block as it passes through. Use of rollover fixtures to dump chips is notable for its frequency. Of course, chip disposal is conveyorized throughout. All transfer machines, incidentally, have full hydraulic operation. At all stations preceding tapping operations, automatic depth-gaging of blind holes is provided to avoid broken taps.

Unique to Chevrolet is the method of rough-boring cylinder walls. Recognizing the fact that these walls are not rigidly supported and may have some variation in thickness, Chevrolet rough bores in pairs of two nonadjacent cylinders to avoid excess heat generation. The success of this technique is borne out by the fact that bores are only slightly warm to the touch immediately after leaving the machine. Not only does this technique avoid the distortion problem, but separating the spindles makes possible the use of heavier spindles with greater rigidity, thus furthering bore accuracy



Boring machines perform intricate operations on cylinder bores at the touch of a button. The engine blocks go through six stations or stops where 16 whirling spindles are equipped to do semifinish and finish boring. Transfer is automatic

and tool life. Holding bores to 0.0005-in. is possible in this operation.

Tolerance Change—Dimensional tolerances of this sort are commonplace in the Chevrolet engine plant and it seems that thousandth-of-an-inch designation will soon become passe, with tens-of-thousandths the common industrial machining unit.

Cylinder bores are finished on a Micromatic honing machine with Microsize attachment. Final size is held within 0.0002-in. Crankshafts are held to 0.0002-in. on taper and diameter and rocker arm studs are ground within 0.0003-in. and pressed into a hole held within 0.0005-in.

Something Different—This rocker arm stud situation is a unique bit in itself. As you perhaps know, the Chevrolet engine utilizes a hemispherical bearing surface for each rocker arm rather than the conventional rocker arm shaft. Engineers found that the lower end of the stud by which the rocker arm is tied down tended to work back and forth if threaded in the cylinder head.

The answer was to press the stud into the cylinder head, and a minimum of 0.00015-in. press is provided. The job is done on a special machine built for the purpose which presses in the eight studs for each cylinder head automatically via hydraulic pressure of 1700 psi. A spot check is made periodically, and if a pressure of 2000 psi moves the stud on a "tenths" indicator gage, engineers begin to look for Fordmen in the conveyors.

Fewer Units—The cylinder head lines are interesting for their paucity of equipment. Three broaches supply the six machining lines—doing the work that took 30 broaches. After the heads are completely broached in two passes, they pass through two automation segments of 20 and 22 stations which do the drilling, tapping and reaming operations to complete the job on each of the six lines.

Also of interest is one of two machines on the intake manifold machining job. One machine is set up to handle just the two-barrel carburetor manifolds, but the second takes either two or four-barreled manifolds. The change is made by merely turning an electrical switch on the control panel to cut in five additional stations for the four-barreled job and cut out certain two-barreled stations. Probes check to be sure the manifolds being fed into the machine are the type for which the machine is set. This precludes tool breakage. The machine shuts down if an improper manifold is entering.

Bearing Cap Facts—A similar sort of dual-purpose automated machine is the unit handling main-bearing caps. In the Chevrolet engine, the rear bearing cap has a protruding lump on the outer side which contrasts with the front and middle bearing caps which have concentric contours. Fixtures have been designed in such a way that gangs of either type of bearing cap can be milled, drilled and tapped on the same equipment even to final operation in which they are milled apart ready to be mounted on the engine.

With the bearing caps installed, the blocks pass through a 14-station Ingersoll cam and crank line boring machine. In addition to semifinish and finish-boring the camshaft and crankshaft bearing lands, it also faces and chamfers the thrust bearing and turns all cam oil grooves. After the flywheel housing is bolted on the block and the inner face and periphery milled in perfect alignment with the crankshaft in a Kearney & Trecker machine, the blocks travel by floor conveyor to the final assembly line.

Finale—Extending across the back wall of the plant, the final assembly line is 467 ft long and is one of two that will ultimately be in place. The engine begins assembly upside down on a saddle-type fixture mounted on a floor conveyor. This conveyor is so designed that after work on the lower half of the engine is completed, the engine may be turned over to finish its trip still on the same saddle.

Its trip is interrupted, however, after the reciprocating parts have been installed by a power-and-free conveyor trip to balancing equipment. Although each rotating part of the engine is balanced individually, slight unbalance of such parts in the same direction could throw the engine out of balance after assembly.

Run at a speed of 700 rpm on the machine, the engine unbalance is neutralized as the operator sets electronic controls. This setting of the controls adjusts drills which then take off the proper amount to correct any unbalanced condition within a half inch ounce.

Return Trip—After testing, the engines are returned automatically by the power-and-free system to the assembly line to finish their trip. Although production engines are not given such a test in normal operations, the first production engine off the line ran wide open for 100 hours, and at the end of that time, showed no measurable wear on bearing surfaces—a truly impressive showing. So smooth are these engines that a nickel can be balanced on the intake manifold while the engine is running at 2500 rpm.

Auto men have been saying that when Chevrolet got around to its automated V-8 engine plant it would probably be a honey. They won't be disappointed when they see this new home of segmented automation.

The automotive industry may debate the merits of automation vs. segmented automation for sometime to come, but Chevrolet feels that they have the answer.

Auto, Truck Output

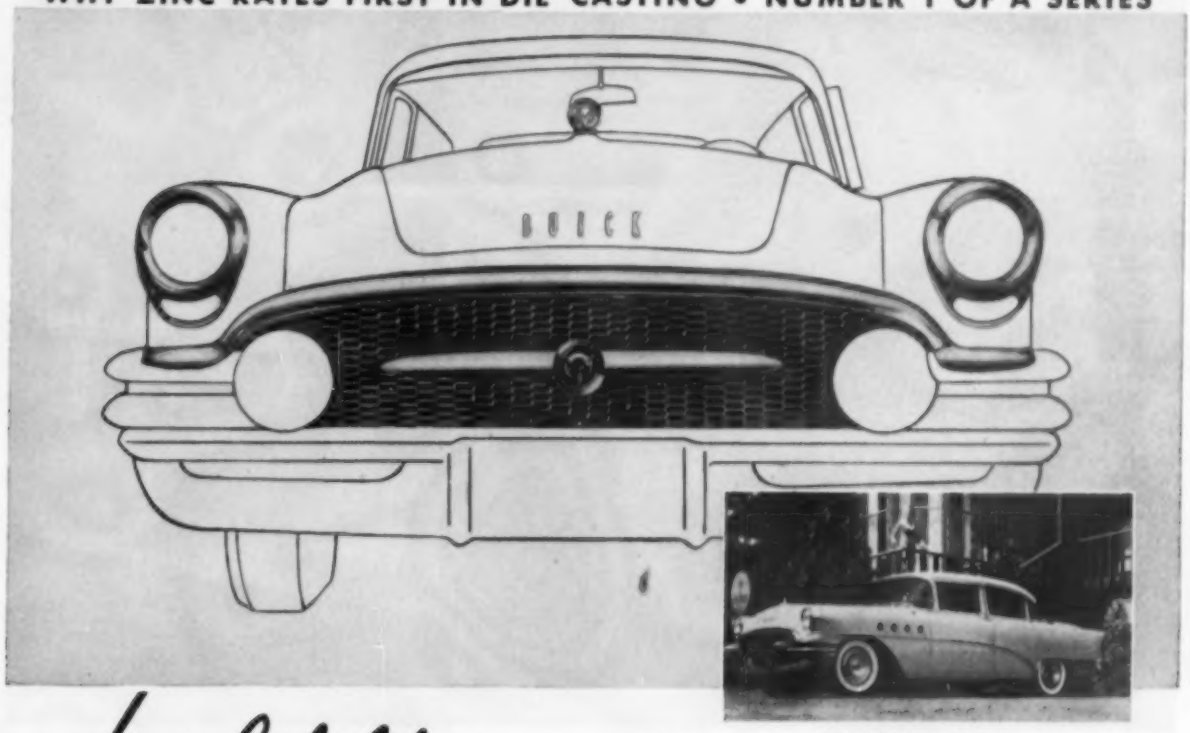
U. S. and Canada

	1955	1954
January	780,780†	594,467
February		573,801
March		672,485
April		676,248
May		621,262
June		623,732
July		543,540
August		523,799
September		364,441
October		312,078
November		616,395
December		761,954
Total		6,884,202

Week Ended	1955	1954
Jan. 22	190,155	146,741
Jan. 29	190,468	143,654
Feb. 5	190,140	139,042
Feb. 12	191,136	141,570
Feb. 19	198,066	148,257
Feb. 26	199,300*	145,980

Source: Ward's Automotive Reports
†Preliminary. *Estimated by STEEL.

WHY ZINC RATES FIRST IN DIE CASTING • NUMBER 1 OF A SERIES



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You have a complete choice of finishes when you specify ZINC die castings for the assembly of your products. Electroplating of ZINC die castings, especially with copper-nickel-chromium, is done on a very large scale. Or you may choose from a variety of organic coatings, such as enamels or lacquers, with assurance that a minimum of surface preparation will be required on the smooth as-cast parts. If a decorative treatment is not needed, but unusual exposure conditions prevail, ZINC die castings can be protected inexpensively by the application of Cronak*—a dichromate dip.

Our advertisments in this magazine in the months ahead will explain why and how ZINC die castings cut costs and improve the salability of a variety of products. Send for a copy of the new brochure shown here and contact any commercial die casting company regarding your particular production problems.

*For full details of the Cronak process write to The New Jersey Zinc Company, 160 Front Street, New York 38, N. Y.

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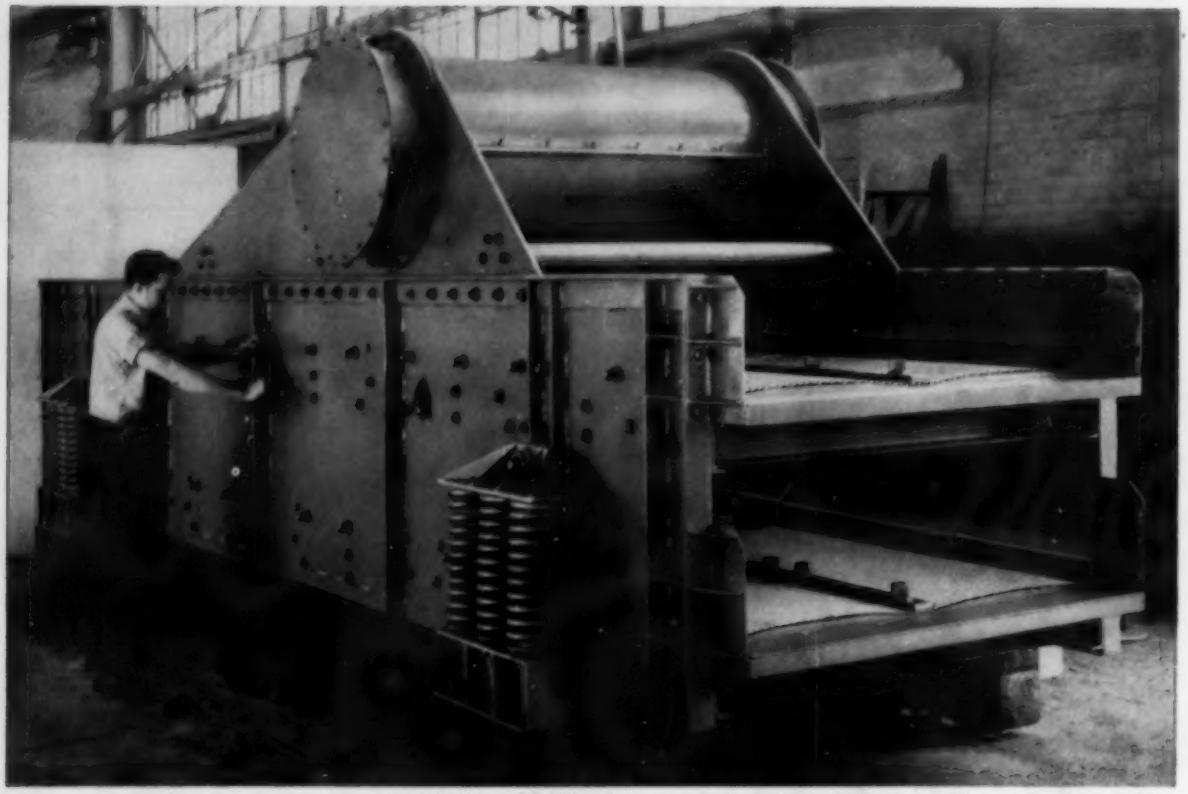


ASSEMBLING an RB&W high-strength bolt on Hewitt-Robins' new Eliptex vibrating machine.

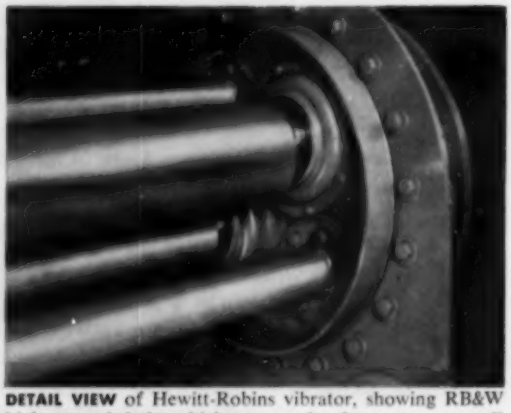
Standardizing on high-strength bolts saves Hewitt-Robins 25%—improves product!

Take a hard look at your fastening operations and you may find you will save a lot by using standard high-strength bolts instead of expensive specials.

Using a standard RB&W high-strength bolt plus a heavy semi-finished nut with two hardened washers, Hewitt-Robins is getting these advantages and savings on vibrating machines: 1. Saving 25% in yearly fastener cost. 2. Eliminating situations requiring body-bound connections with attendant reaming operations. 3. Eliminating all special, finished bolts with varied thread lengths and also all special lock nuts. 4. Eliminating procurement problems and slow delivery of specials. 5. Reducing nut and bolt inventory. 6. Obtaining better performance and lower maintenance on units.

The RB&W product has 2½ to 3 times the clamping force of the previous fasteners. Thus the assembled connection is better able to withstand severe vibration.

Maybe your operation doesn't give fasteners as hard a time as vibrating equipment, but it pays to look into the savings you can expect from specifying standards instead of specials. RB&W has the answers to your questions.



DETAIL VIEW of Hewitt-Robins vibrator, showing RB&W high-strength bolts which must resist shear stress as well as vibration. 4.8

See our insert on high-strength bolts in Sweet's Architectural and Industrial Construction Files.

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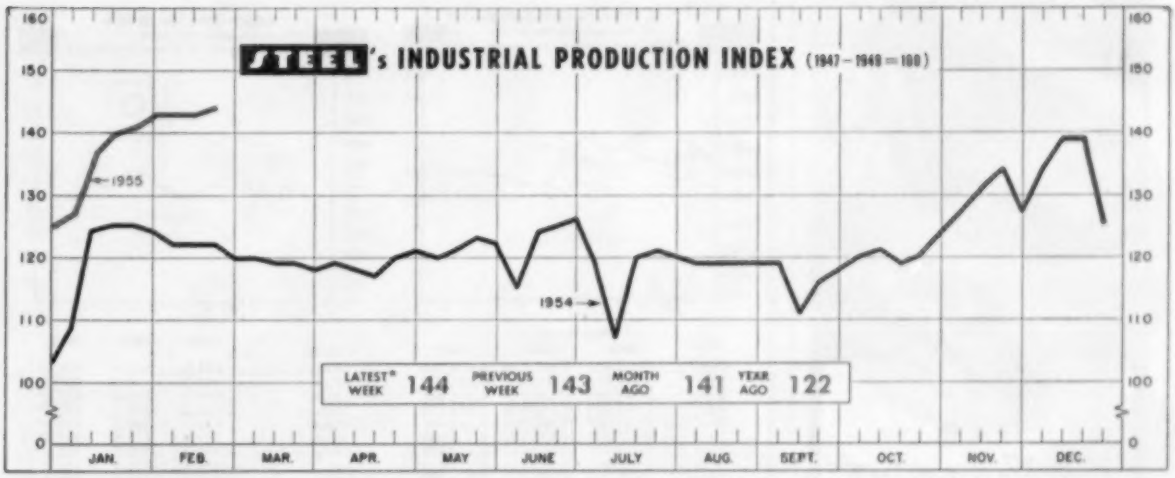

*Week ended Feb. 19. Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Auto Assemblies 11%.

More Business, Competition Push Up Inventories

INVENTORIES will show a marked upswing in March and April. Prime reasons are: 1. Generally higher sales and a feeling that 1955 will be a good one for most lines of business. 2. Lengthening deliveries on many industrial items. 3. Seasonal factors which usually push inventories to yearly peaks in those months.

Still, inventories will not rise to the high levels of late 1953. Memories of overloaded shelves are still fresh.

Promises — Helping to push inventories up is the competitive business climate. New orders usually rise in early spring, many companies will build stocks so they can promise fast delivery.

That in itself will have a double-barreled effect on inventories. If deliveries are good, working stocks may be allowed to run at somewhat lower levels than they might otherwise. But stocks of finished goods will probably go up. The net result will be an over-all increase.

Precedent—Scare buying is not likely to be much of a factor as yet. Severe strikes in supplier industries, while possible, are still in the guessing stage. And defense buying shows no sign of mushrooming.

Also pointing to somewhat higher inventories are some things that started at the end of last year. Production was rising, calling for a more than seasonal increase in working stocks. Stocks of finished goods were under expected levels, partly a result of a buying upturn that was better than expected, partly because many stocks were low to begin with.

Production—Underlying all the inventory buildup, of course, is production. The Federal Reserve Board puts industrial output in January at 131 per cent of the 1947-1949 average. The index was 132 in January of 1953 and 125 in January of last year.

The way business is going, the index should jump another two to four points for February, contin-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,153	2,150	1,756
Electric Power Distributed (million kwhr)	9,905[1]	9,922	8,551
Bitum. Coal Output (1000 tons)	8,700	8,700	7,595
Petroleum Production (daily av.—1000 bbl)	6,715[1]	6,719	6,319
Construction Volume (ENR—millions)	$193.9	$298.9	$149.7
Automobile, Truck Output (Ward's—units)	198,066	191,136	148,257
TRADE			
Freight Car Loadings (unit—1000 cars)	640[1]	644	619
Business Failures (Dun & Bradstreet, no.)	240[1]	238	215
Currency in Circulation (millions)[3]	$29,743	$29,779	$29,821
Dept. Store Sales (changes from year ago)[3]	0%	0%	−1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$20,276	$19,103	$18,550
Federal Gross Debt (billions)	$278.3	$278.4	$274.7
Bond Volume, NYSE (millions)	$20.5	$23.5	$18.9
Stocks Sales, NYSE (thousands of shares)	16,818	17,108	8,712
Loans and Investments (billions)[4]	$84.9	$85.4	$79.9
U. S. Gov't. Obligations Held (billions)[4]	$35.3	$35.8	$32.4
PRICES			
STEEL's Finished Steel Price Index[5]	194.53	194.53	189.74
STEEL's Nonferrous Metal Price Index[6]	226.7	228.6	201.3
All Commodities[7]	110.3	110.3	110.5
Commodities Other Than Farm & Foods[7]	115.4	115.5	114.4

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278. 1954, 2,384,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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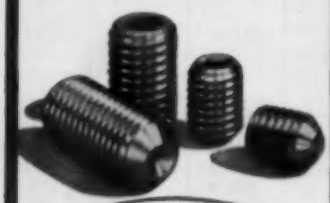

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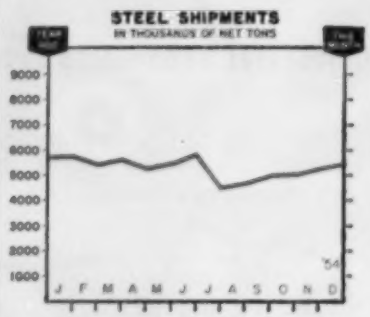
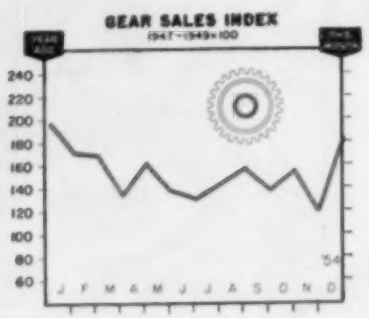
THE BUSINESS TREND





Net Tons	1954	1953	1952
Jan.	5,727,680	7,067,636	6,589,193
Feb.	5,364,978	6,533,227	6,358,293
Mar.	5,563,690	7,436,919	6,890,391
Apr.	5,297,972	7,162,460	5,922,173
May	5,423,168	7,209,396	5,947,450
June	5,887,455	6,950,059	1,250,243
July	4,490,179	6,582,513	1,413,672
Aug.	4,681,242	6,498,605	6,312,118
Sept.	5,004,223	6,400,757	6,542,147
Oct.	5,035,364	6,726,880	7,155,611
Nov.	5,240,209	5,903,980	6,647,725
Dec.	5,448,649	5,654,920	7,165,387

American Iron & Steel Institute.
Charts Copyright 1955 STEEL.

	1954	1953	1952
Jan.	167.4	161.4	670.6*
Feb.	165.1	188.1	539.5*
Mar.	128.6	156.9	617.1*
Apr.	158.2	217.1	478.7*
May	132.5	180.8	425.9*
June	127.4	146.5	452.3*
July	141.3	120.7	145.3
Aug.	154.7	121.6	133.3
Sept.	135.1	135.6	143.4
Oct.	152.3	211.1	160.8
Nov.	116.7	144.9	150.9
Dec.	182.2	194.0	140.9

*(1935-39=100)
American Gear Mfrs. Assn.

uing the upward trend that began in the last quarter of 1954.

Primary metals and autos are sure bets to show gains. Trucks will be off a good bit because of model changeovers. Metal fabricators and machinery builders should improve a little. Appliances will hold strong.

Business Pickup Continues . . .

Because of its highly diversified industry, Cleveland business usually parallels national developments. The picture is steadily brightening. For example, more than half the indicators used by the Federal Reserve Bank of Cleveland are higher than they were a year ago. Steel and residential construction are outstanding strong points.

Employment is about 4 per cent under that of a year ago, but improvement is on the way. Manufacturing gains are expected by employers in metals, autos and auto equipment, aircraft parts and the miscellaneous category. Construction hiring, delayed by unfavorable weather, will also shoot up. The rise will be aided by pre-Easter gains in trade, transportation and service industries, says the Ohio State Employment Service.

In another metalworking center, Pittsburgh, business is highest since February, 1954. Steel is an important factor. Autos, coal and freight car loadings are also up, according to the Bureau of Business Research of the University of Pittsburgh.

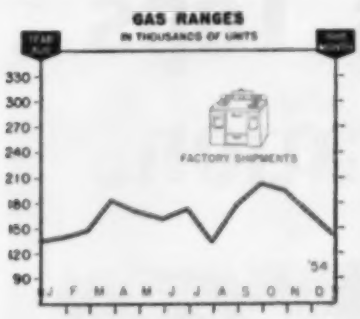
Employment Ups and Downs . . .

Nationally, employment was down in January. The largest drops were post-Christmas layoffs of temporary employees in retail stores and post offices. On the other hand, employment in trade, services and finance was at an all-time high for the month. Construction employment also was good.

Slackening production in consumer goods industries after the Christmas rush was responsible for most of the drop in factory employment. Primary metals continued their steady upward push. Metal fabricators were up some, as was transportation. Machinery showed a slight gain. Ordnance, electrical machinery and instruments were down.

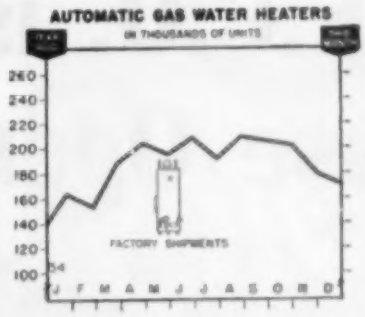
Auto Race Speeds Up . . .

Automakers plan no slackoff in production for the rest of the first



Shipments—Units	1954	1953	1952
Jan.	137,000	169,200	168,100
Feb.	152,900	185,900	166,200
Mar.	188,200	208,200	185,200
Apr.	172,400	220,300	182,300
May	163,800	181,000	162,800
June	174,300	166,600	175,700
July	134,500	150,000	154,200
Aug.	179,400	156,800	178,600
Sept.	203,900	209,500	199,600
Oct.	197,100	203,900	239,700
Nov.	170,500*	155,500	186,400
Dec.	143,200*	134,400	178,600
Total	2,017,200	2,183,300	2,175,400

Gas Appliance Mfrs. Assn
*Preliminary.



Shipments—Units	1954	1953	1952
Jan.	164,400	189,900	148,700
Feb.	175,000	194,200	145,800
Mar.	187,800	207,400	153,300
Apr.	200,800	209,500	155,200
May	195,600	183,300	153,300
June	206,700	181,200	159,000
July	190,300	178,800	131,300
Aug.	207,100	166,100	161,500
Sept.	205,500	179,600	171,200
Oct.	202,000	194,300	185,300
Nov.	179,100	155,600	167,100
Dec.	170,700*	141,900	178,800
Total	2,285,000	2,182,700	1,910,400

Gas Appliance Mfrs. Assn.
*Preliminary.

half. Present production schedules call for 4 million cars to be built between January and June, says *Ward's Automotive Reports*.

That means a screeching halt is in prospect from June until it's time for 1956 models to take over. If the proposed schedules are met, over 5 million 1955 models will have been built by the end of June (over a million were turned out in the closing months of 1954). Estimates for sales this year run about 5.8 million. That means fewer than 1 million cars will remain to be built through the summer.

Records Busting . . .

In the meantime, records are falling like rain. Monthly records were set in November, December and January. Another is due this month. Almost 670,000 units are planned, and the record for the month (507,355) was racked up in 1951.

Another mark seems doomed in March. Schedules call for 100,000 more cars than in February and the biggest month in history. Present high for one month was set in June, 1950, when 720,100 were turned out. The record for a single quarter is also in danger. This year it looks like production will go over 2 million, beating the 1,898,783 turned out in July-September, 1950.

Setting the pace are the Ford-Chevrolet battle for top position and Chrysler's bid to get back its traditional 20 per cent of the market.

Trends Fore and Aft . . .

New orders in January were up almost 10 per cent from December, says the American Supply & Machinery Manufacturers' Association Inc. That pegs them at 164.4 per cent of the base month of June, 1948 . . . Westinghouse Electric Corp. expects a gain of about 10 per cent in new orders this year over 1954's . . . General Electric Corp. in 1955 will spend about $165 million for modernization of plant, laboratories and equipment, up from $159 million in 1954 and $141 million in 1953. The company's total postwar investment will be more than $1.1 billion by the end of this year . . . Eaton Mfg. Co. is tooling to produce a car air conditioner "that can be sold at a price within the range of the average car owner" . . . Orders in January for 5087 freight cars are highest in two years. The backlog of 18,395 is best since last March.

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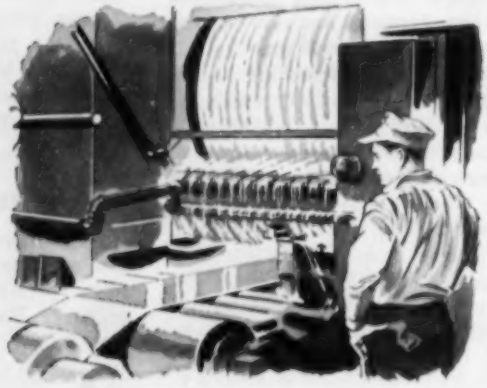

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DANIEL MEEKER
. . . Toledo Porcelain Enamel v. p.

Daniel Meeker was named vice president, **Toledo Porcelain Enamel Products Co.**, Toledo, O. He was sales manager of the firm, a subsidiary of Bettinger Corp.

W. C. Robinson Jr. was elected president of **National Electric Products Corp.**, Pittsburgh. **A. L. Robinson** was elected chairman of the board, and **W. C. Robinson**, founder of the firm, was elected honorary chairman.

Paul W. Brannon joined **Cloyes Gear Works Inc.**, Cleveland, as manufacturing vice president. He was vice president and works manager, Pesco Products Division, Borg-Warner Corp.

Universal-Cyclops Steel Corp., Bridgeville, Pa., appointed **Edward E. Hall** technical director-tool steels. He was chief metallurgist at the firm's Titusville, Pa., plant.

Soule Steel Co., San Francisco, elected **Frank Kullmer** vice president-engineering, and **W. B. Reinheimer**, vice president-treasurer. Mr. Kullmer is succeeded as chief engineer by **C. H. Peterson**.

Leo C. Harrington was made steel buyer for **Maytag Co.**, Newton, Iowa.

W. A. Marquardt was made assistant manager of **D. J. Murray Mfg. Co.**, Wausau, Wis.

W. SHERIDAN HUSS
. . . Acme Steel Products v. p.-gen. sales

Acme Steel Products Division, Acme Steel Co., Chicago, appointed **W. Sheridan Huss** vice president and general sales manager. He formerly served as vice president of the division's southern sales area with headquarters in Atlanta. Other appointments include **John W. Karstens** as vice president, steel-strap department; **Edward C. Evans**, vice president, unit-load department; and **Arthur G. Denne**, vice president, stitching department. These men are responsible for promotion of sales of their products in the United States and Canada.

Link-Belt Speeder Corp., Cedar Rapids, Iowa, subsidiary, Link-Belt Co., appointed **C. M. Basile** vice president of manufacturing and sales, and **Gordon W. Rowand**, sales manager.

Pittsburgh Steel Co., Pittsburgh, promoted **Paul R. Totten** to division superintendent at its Allenport, Pa., sheet division, and **William C. Ackerman** to assistant divisional superintendent. **Kenneth C. McDonough** was made staff assistant-general sales.

E. Gordon Ball Jr. was promoted from Chicago district sales manager to vice president-sales for **Luria Engineering Co.**, Bethlehem, Pa. He succeeds **Grant A. Sattem**, now executive vice president of Luria-Cournand Inc.

EMMET F. HARDING
. . . Hodell Chain sales manager

Emmet F. Harding was named sales manager, **Hodell Chain Co.**, Cleveland, a division of National Screw & Mfg. Co. He was Port Chester sales manager of Russell, Burdsall & Ward Bolt & Nut Co.

Adm. Alan G. Kirk was elected chairman of **Alloy Precision Castings Co.**, Cleveland, recently acquired by Mercast Corp.

General Motors Corp., Detroit, appointed **Semon E. Knudsen** general manager, Detroit Diesel Engine Division, to succeed **William T. Crowe**, retired. Mr. Knudsen was manufacturing manager for aircraft engine operations at the Allison Division, Indianapolis. **Edward D. Rollert** was made general manager of the Harrison Radiator Division at Lockport, N. Y., to succeed **Douglas B. Whitney**, retired. Mr. Rollert was manager, B-O-P Assembly Division, Kansas City, Kans., and is replaced there by **Wallace E. Wilson**.

Nooter Corp., St. Louis, elected **Philip H. Smith** vice president-sales engineer.

Herbert Heesch was named general sales supervisor of **Hooker Electrochemical Co.**, Niagara Falls, N. Y.

Paul H. Butterfield was named specifications specialist for **Nelson Stud Welding Division**, Gregory In-

DOUGLAS C. LYNCH
. . . Brush Electronics president

JOSEPH P. GREEN
. . . Swartwout director-engineering

JAY W. SCHNACKEL
. . . IBM manufacturing v. p.

dustries Inc., with headquarters in New York.

Douglas C. Lynch, former executive vice president of **Brush Electronics Co.**, Cleveland, was named president of the company, a unit of Clevite Corp.

R. J. Kiefer was promoted to district works manager, refractories division, at **Laclede-Christy Co.**, St. Louis, division of H. K. Porter Company Inc. He was assistant general superintendent.

Max I. Alimansky was named general manager of **General Electric Co.'s** rectifier department, Lynn, Mass. He succeeds **William J. Fleming**, now on leave of absence.

Matthiessen & Hegeler Zinc Co. appointed **Howard Mellor** eastern sales manager at New York.

Vincent Gerbereux was made general manager, standard pumps division, a new division established at Harrison, N. J., by **Worthington Corp.**

Joseph P. Green was made director of engineering for **Swartwout Co.**, Cleveland, a new position established to provide unified supervision of the three company divisions, autronic control, power plant equipment and industrial ventilation. He has been with Swartwout since April, 1953, as chief engineer, application engineering department.

Alfred O. Morkish was appointed general manager of **American Can Co.'s** closing machine department, New York.

Charles H. Griffith, general sales manager, and **John M. Zimmerman**, works manager, were elected vice presidents of **International Resistance Co.**, Philadelphia.

Jay W. Schnackel was promoted to vice president-manufacturing by **International Business Machines Corp.**, New York. He was previously general manager of the Endicott, N. Y., plant and is succeeded in that post by **Arthur L. Becker**, former assistant general manager.

John W. Albright was made works manager, Globar Division, **Carborundum Co.**, Niagara Falls, N. Y.

Industrial Crane & Hoist Corp. appointed **Lewis W. Bentley** manager of its Detroit office.

Homestead Valve Mfg. Co., Coraopolis, Pa., promoted **Fred Schuchman** to general sales manager.

Inland Steel Container Co., Chicago, division of Inland Steel Co., appointed **L. M. Ansley** director of purchases; **E. W. Seefeldt**, purchasing agent, Chicago plant; **J. J. Dini**, purchasing agent, Jersey City, N. J., plant; and **J. M. O'Donnell**, purchasing agent, New Orleans plant.

Diamond Power Specialty Corp. appointed **Herman Krapf** manager of its Chicago district office.

Barber-Colman Co., Rockford, Ill., appointed **Howard A. Nelson** sales manager, small tool division; and **Charles A. Torson**, sales manager of its new Hendey Machine Division.

Robert E. Budde, previously with Bristol Co. as Chicago area sales engineer, joined **Swartwout Co.**, Cleveland, as regional product manager for the Midwestern area.

W. C. Garcelon was appointed general manager, **Stainless Piping Supply Inc.**, Charleston, W. Va., to succeed **D. E. Parsons.** Mr. Garcelon will be in charge of sales and manufacturing.

R. B. Osbourne fills the newly created position of vice president-engineering at **Phillips Corp.**, Carnegie, Pa.

D. R. Thrush was appointed chief design engineer of cranes at **Morgan Engineering Co.**, Alliance, O. He was crane engineer at Great Lakes Steel Corp.

John R. O'Connor was promoted to manager of sales, central division, **Graver Tank & Mfg. Co. Inc.**, with headquarters at its plant in East Chicago, Ind.

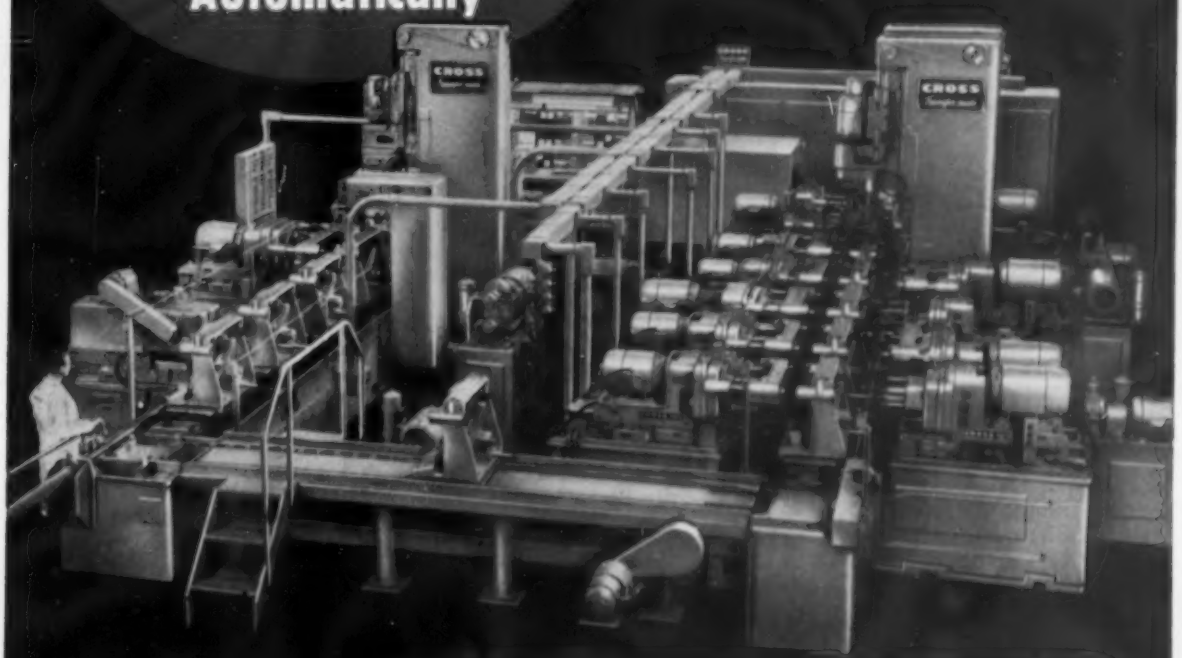
Russell T. Lowe was made assistant chief engineer of **Barry Corp.**, Watertown, Mass.

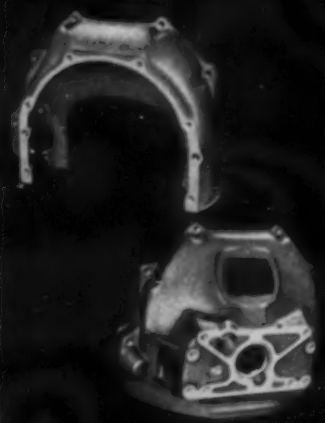
Morey Machinery Co. Inc. appointed **Arnold S. Restan** director of international operations, with headquarters in New York.

Motordyne Inc., Los Angeles, appointed **James P. Nadar** vice presi-

Machines Flywheel Housings and Changes Set Up Automatically

Another Transfer-matic by Cross





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JOSEPH V. DELANEY
. . . Columbia gen. mgr., Lodge & Shipley

WARREN H. BRAND
. . . Conoflow v. p.-engineering and research

dent-sales, **James J. Marino**, vice president-engineering; and **Frank Petshak**, works manager.

Harold W. Jones, vice president and general manager of the Cleveland branch of **Kurt Orban Co. Inc.**, was elected executive vice president and transferred to the home office of the company in Jersey City, N. J. He will be in charge of sales of oil country tubular goods and will co-ordinate import and export activities of the steel division.

Lyle D. Bunce was named national general sales manager of **U. S. Relay Co.**, Los Angeles.

H. L. Buckmaster joined **Daubert Chemical Co.**, Chicago, as chief chemist of its adhesives and sealers division.

E. M. Detwiler was made works manager of **Lake Erie Engineering Corp.**, Buffalo.

Roy C. Hobson was promoted to manager of the Chicago plant of **National Malleable & Steel Castings Co. Allan S. Bixby** was made manager of the Melrose Park, Ill., plant.

Joseph V. Delaney was made general manager, Columbia Division, **Lodge & Shipley Co.**, Hamilton, O. He succeeds **John R. Queen**, resigned to accept a position with Globe Hoist Co. Mr. Delaney previously served the Columbia Division as controller.

Daniel B. Sikes was named vice president and general manager of **Whalen-Bronson Inc.**, San Diego, Calif.

John D. Joyce was appointed industrial sales manager of **Blue M Electric Co.'s** industrial division, Blue Island, Ill.

T. W. Eshbach was made boiler sales manager, **Dutton Boilers Division**, Hapman-Dutton Co., Kalamazoo, Mich.

Harry Knudson was made manager, middle Atlantic sales region, **Federal Pacific Electric Co.**, with headquarters at Newark, N. J.

Robert L. Jenkins was made quality manager, **Dodge Division**, Chrysler Corp., Detroit.

Warren H. Brand was elected vice president in charge of engineering and research for **Conoflow Corp.**, Philadelphia. He joined the company in May, 1954, as director of engineering and research.

H. Russell Klinzing was made assistant manager, industrial lock sales, **Yale Lock & Hardware Division**, Yale & Towne Mfg. Co., Stamford, Conn.

L. C. Holloman Jr. was made manager, central sales region, **Hewitt-Robins Inc.**, with headquarters in Chicago. He succeeds **Lester D. Bigelow**, retired.

Toledo Pickling & Steel Service Inc., Toledo, O., appointed **Harold Osburn** sales manager. He was formerly with Kaale Steel Corp.

E. C. Reid succeeds **W. W. Fitchett**, resigned, as purchasing agent, **F. X. Hooper Co. Inc.**, Glenarm, Md.

A. J. Lamond was made manager of packing sales for **Quaker Rubber Corp.**, Philadelphia, division of H. K. Porter Company Inc.

OBITUARIES . . .

Roy B. Erickson, 51, president, **Anderson-Shumaker Co.**, Chicago, died Feb. 13.

John G. Loy, president, **Porcelain Products Inc.**, Parkersburg, W. Va., died Feb. 1.

Arthur F. Milbrath, 75, who retired last October as vice president and chief engineer of **Wisconsin Motor Corp.**, Milwaukee, died Feb. 15.

Fred E. Forsgren, 56, district sales manager in northern Indiana for **Illinois Tool Works**, Chicago, died Feb. 14.

Douglas S. Hines, 65, chief purchasing agent, **Dominion Steel & Coal Corp.**, Sydney, N. S., died Feb. 13.

Thomas S. Quinn, 67, co-founder and treasurer, **Lebanon Steel Foundry**, Lebanon, Pa., died Feb. 20.

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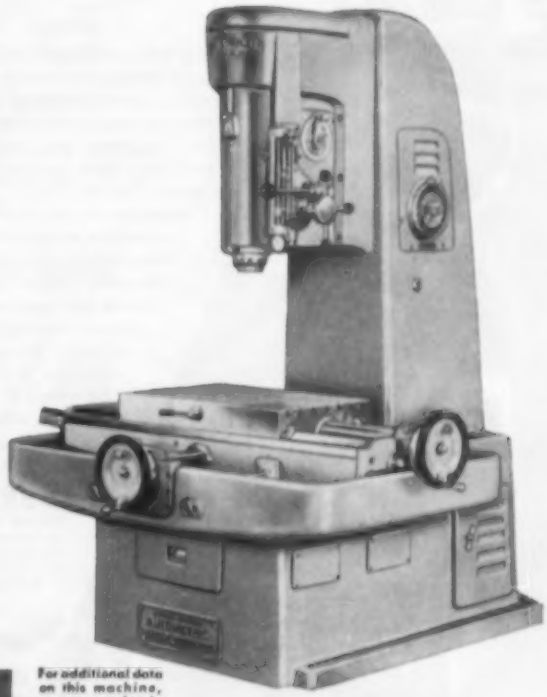
For complete information on Tool-Lease, see your Kearney & Trecker representative or mail coupon to Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wisconsin.



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Precision Mechanisms Industry—Includes machines for laboratory, scientific and engineering instruments; mechanical measuring, controlling instruments; optical, surgical; medical, dental instruments and equipment; photographic equipment; watches, clocks, clockwork devices, and parts. Of the total 8,295 machines, 10% are over 20 years old, over 36% are 10 to 20 years old.10 to 20 years old.

Machines over 20 years old, which should definitely be replaced.	Machines 10-20 years old, which should probably be replaced.	Machines less than 10 years old.
882 automatic and manufacturing type milling machines	45%	44%
2550 vertical milling machines	30%	66%
4087 knee type horizontal milling machines	40%	45%
380 bed type milling machines	31%	69%
396 horizontal and vertical precision boring machines	23%	74%

Figures adapted from 1953 American Machinist survey of Metalworking Industry.

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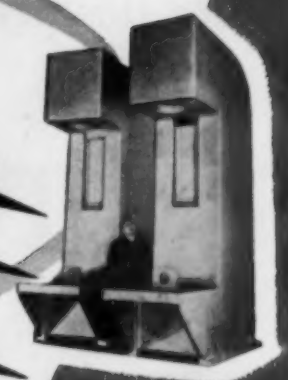

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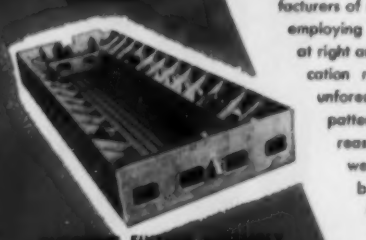

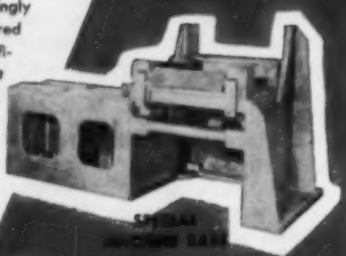

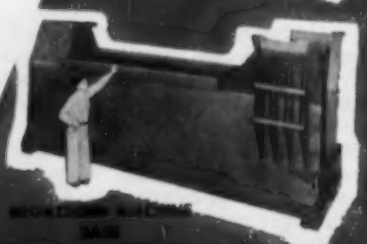

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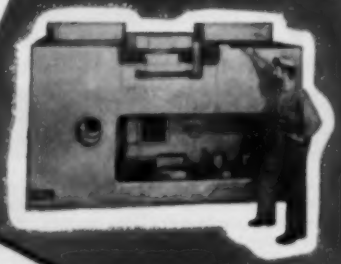

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Westinghouse Expands

$32-million project more than doubles Steam Division's productive capacity

COMPLETION of Westinghouse Electric Corp.'s $32-million expansion program at its Steam Division, South Philadelphia, Pa., has more than doubled the division's productive capacity for steam turbines and associated equipment. In addition to expanded manufacturing and testing facilities, a new, $6-million steam and gas-turbine research and development laboratory has been completed.

The program also involved reoccupancy, under lease agreement, of the Navy-owned Merchant Marine plant adjoining the South Philadelphia Works, extensions to existing buildings and extensive purchases of new machine tools.

Steady Growth—Since the turn of the century, the electric utility industry has nearly doubled its generating capacity every decade. The continuing rapid growth of the industry, says W. C. Rowland, vice president and manager, Steam division, has called for greatly increased production of generating apparatus, both in number of units and their sizes.

The reactivated Merchant Marine facility provides the division with 35 per cent more manufacturing area. The main building has more than 600,000 sq ft of manufacturing space. Fabricating and welding facilities at the division have been increased some 90 per cent; drop forge shop and heavy machining operations by about 50 per cent. Machine tools acquired cost more than $10 million. Some of the larger machine tools include a 28-ft vertical boring mill, a 96-in. engine lathe, and a 10-ft planer-miller machine.

A key part of the $6-million laboratory is the instrument room, which contains more than $300,000 worth of indicating, recording and calibrating instruments.

Koppers Buys Machinery Firm

Koppers Co. Inc., Pittsburgh, purchased F. X. Hooper Co. Inc., Glenarm, Baltimore county, Maryland. The latter company produces wood printing machines, printing and boxmaking machinery for corrugated shipping containers. The plant contains 50,000 sq ft. The company will continue under its present name. Koppers has no plans for enlargement of the property through transfer of any of its departments to this new facility.

Fabricator Enlarges Plant

Ornamental Iron & Brass Co., Essex, Md., is building a 2400-sq-ft plant addition. Clair C. Noppenberger is president.

Bliss Builds Machinery Plant

E. W. Bliss Co., Canton, O., is producing container making and ultra-high-speed automatic can-making machinery in its new plant at Hastings, Mich. Frederick B. Porteous, formerly chief engineer of the Hastings Division, is manager of the plant.

Delta Welder Corp. Formed

Delta Welder Corp. has been organized in Detroit. Its plant and offices are at 8525 Livernois. The firm will design and build completely automatic multiple-point welding machines. Officers are H. E. Day, president; Glenn Cashdollar, vice president; Arthur Zebedee, secretary-treasurer.

Dow Chemical Opens Office

Dow Chemical Co., Midland, Mich., opened a field sales office at 925 Common St., New Orleans. It is under the direction of Glenn H. O'Neal, manager of Dow's St. Louis office.

Kenmore Metals Changes Hands

National Standard Co., Niles, Mich., acquired the operating assets of Kenmore Metals Corp., Jersey City, N. J., and will operate the plant as its Kenmore Metals Division. The division was added to expand National Standard's line of noncorrosive and decorative finishes for its wire and wire products. Acquisition includes rights to a continuous plating process for the electrodeposition of nickel, copper, brass and other metals on ferrous and nonferrous wire and tubing. Kenmore also has facilities for drawing stainless steel wire. National Standard is a major producer of tire bead wire and other specialty wires.

Quick as a Flash

FACSIMILE transmission of complete orders for goods, including the order form itself as well as the details, has been inaugurated at U. S. Steel's Supply Division Northside Pittsburgh warehouse. Transmittal time of the initial customer order for steel bars was 2.6 min.

The transmission system, leased by Western Union, will send full-size correspondence by picture at the rate of 300 words a minute.

A button is pushed and the machine does the rest. It automatically rotates the memo before an electric eye at 360 rpm. The eye flashes an exact image to the distant receiving machine. There can be no mistake; the machine sends exactly what it "sees."

Tankmaker Expands Plant

Allan U. Bevier Inc., Baltimore, is building a 7800-sq-ft plant addition. The company makes steel domestic oil tanks, septic tanks and recently has begun the production of aluminum and stainless steel tanks. Allan U. Bevier is president.

Federal Machine Buys Firms

Federal Machine & Tool Co. Inc., Long Island City, N. Y., acquired Atlantic Carbide Co. and Colonial Tool & Cutter Co., both of Rochelle Park, N. J. The property will be operated as Federal Carbide & Cutter Co. Inc. and will be affiliated with Federal Machine & Tool Co. Inc. and the latter's subsidiary, Federal Services Co., which specializes in tool design. Officers of Federal Carbide include Arthur Ellins, president; Don de Salvo, vice president and treasurer; A. B. Rosenberg, vice president and secretary. Concentrating on carbide and high-speed steels, the company will render a complete cutter grinding service and will convert stand-

ard tools into special tools, as well as manufacture single-point tools and form tools.

Forms Warehousing Firm

Your Steel Supply Co. was organized in Toledo, O., to warehouse hot-rolled bars, structurals, plates, sheets, strip and allied products. The firm will erect a warehouse and will include facilities for shearing and flame cutting. Officers are George A. Fedurek, president, and James C. Kroon, treasurer.

Wooldridge Mfg. Changes Hands

Wooldridge Mfg. Co., Sunnyvale, Calif., has been sold to Continental Copper & Steel Industries Inc., New York. Wooldridge produces heavy earth moving equipment, code vessels, tanks, bins and other fabrications.

Reliance Buys Reeves Pulley

Reliance Electric & Engineering Co., Cleveland, purchased Reeves Pulley Co., Columbus, Ind., manufacturer of variable speed transmissions and mechanical vari-speed drives. Reeves will be operated as a separate division and will retain its present management. Reliance Electric is a major producer of electric motors and electronically controlled drive systems which play a prominent role in automation for industry.

Thompson Wire Expanding

Thompson Wire Co., Baltimore, maker of steel specialty strip, is building a 12,000-sq-ft plant addition. The company's Baltimore plant has 50,000 sq ft and was placed in operation last spring. General offices of the company are in Boston.

Campbell Chain Builds in West

Campbell Chain Co., York, Pa., is constructing a building in Portland, Oreg., to expand its warehousing and distributing facilities in the Pacific Northwest. The building will contain about 20,000 sq ft of floor space.

Seymour Modernizes Plant

Seymour Mfg. Co., Seymour, Conn., is modernizing its plant production line at a cost of $2 million. New equipment will include a rolling mill, slitter and annealing furnaces. The units will step up both output speed and product quality. Seymour processes metals, including nickel silver and phosphor bronze into sheets, rods and wire.

From Little Bricks Great Coke Ovens Rise

Transforming an 11,000-ton mountain of bricks of more than 500 intricate shapes into three 64-oven coke batteries is the job of these and 140 other bricklayers at U. S. Steel Corp.'s Clairton Works, Clairton, Pa. Standing in 18-in.-wide oven spaces, they're building flues which will take off by-product gas produced by the ovens. Clairton's coke batteries consume about 35,500 tons of coal daily to produce about 20,000 tons of coke for district U. S. Steel blast furnaces

REPRESENTATIVES

Rotor Tool Co., Cleveland, maker of portable tools, appointed Olsen Co., 5341 Santa Monica Blvd., Los Angeles 29, as a dealer in Southern California.

Vulcan Crucible Steel Co., Aliquippa, Pa., appointed Steel Specialties Inc., Baltimore, as sales agent for its tool steels in that district.

Wiretex Mfg. Co., Fairfield, Conn., appointed the following distributors of its baskets for plating, heat treating, production and maintenance: Apothecaries Hall, Waterbury, Conn.; Baker Bros. Co. Inc., South Boston, Mass.; Mitchell-Bradford Chemical Co., Stratford, Conn.; Crown Rheostat & Supply Co., Chicago; Empire Electro Plating Supply Co., New York; Frederick Gumm Chemical Co., Kearny, N. J.

Ready Tool Co., Bridgeport, Conn., appointed the following distributors for its centers, grinder dogs and milling machine dogs: Bearings Inc., Philadelphia; Geo. Worthington Co., Cleveland; Chandler & Farquhar, Boston; Louisville Mill Supply Co., Louisville; Sonnet Supply Co., Hawthorne, Calif.; Sager-Spuck Supply Co. Inc., Albany, N. Y.

Cambridge Wire Cloth Co., Cambridge, Md., appointed R. D. Travers Co., Hamilton, Ont., distributor in the provinces of Quebec and Ontario. Products include woven wire conveyor belts, industrial wire cloth, special metal fabrications and gripper woven wire slings.

Research Appliance Co., Pittsburgh, appointed Process Controls Co., Detroit, as its sales representative handling its line of chemical pumps, air sampling equipment and specialty items in that area.

Announcing

WALES

QUICK-CHANGE PUNCHING & GAUGING ASSEMBLY

Showing how easily and quickly the punch and die is removed and replaced in the Wales Quick-Change Holder for punching holes up to 1¼" in diameter. To remove the die, pull the holder forward and hit the punch head with hand which releases the ball-held die from bottom of holder. Punch assembly is merely lifted out of top of holder.

Converts presses into a versatile hole punching machine with **20 SECOND PUNCH AND DIE CHANGE**

● This new, self-contained press accessory pays for itself in a matter of a few months...in some cases in a matter of weeks by such unusual time saving advantages as changing punches and dies in 20 seconds. Holder keeps punch and die in permanent alignment. Built-in adjustable gauging provides a new, simple, fast, accurate method of locating the work.

Popularly known as the Wales "PPG Group", it consists of a bed plate, quick-change holder, 18" back gauge bar, 18" stop support rail and a combination punch storage cabinet and tool rack.

This is too BIG a story to tell in this space, so write for illustrated PPG Bulletin.

Showing Wales 3½" Holder for punching holes up to 3½" in diameter. This holder is not part of the "PPG Group" but is available as optional equipment.

WALES-STRIPPIT CORPORATION

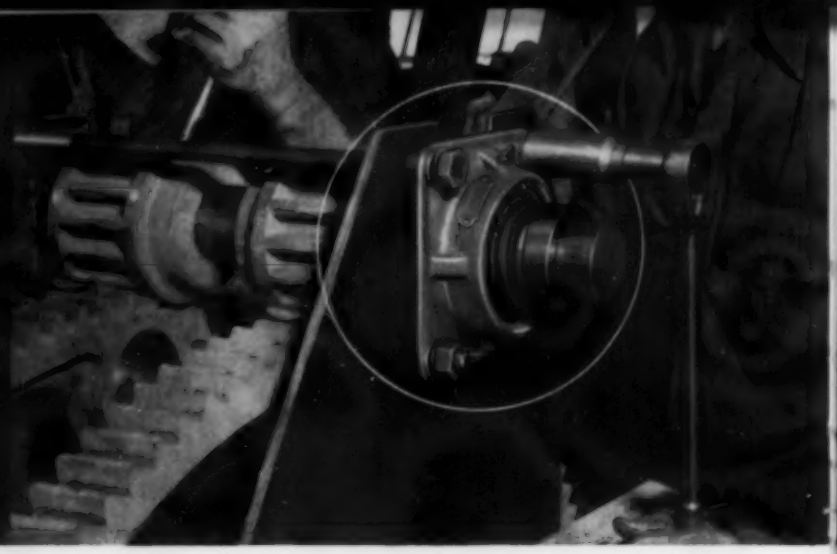
George F. Wales, Chairman

588 Payne Avenue, North Tonawanda, N. Y.

(Between Buffalo and Niagara Falls)

WALES-STRIPPIT OF CANADA LTD., HAMILTON, ONTARIO

See WALES Equipment in operation at the ASTE Western Industrial Exposition in Los Angeles, March 14-18, BOOTH 1027.



If assembly costs are lower

chances are

Fafnir has a bearing on it

Type LCJ Self-Aligning Ball Bearing Flange Cartridge equipped with Wide Inner Ring Mechani-Seal Bearing and Self-Locking Collar. For shaft diam.: ½" to 2 15/16".

The installation of a Fafnir Ball Bearing Flange Cartridge on the pinion shaft illustrated is being made with a socket wrench. No complicated blue prints, no costly machining, no time-consuming fitting and adjusting of bearing. Assembly costs have been cut without cutting corners.

The use of a completely-housed ball bearing unit is only part of this cost-cutting operation. The *Fafnir Unit* offers additional cost savings. Its bearing inner ring is bored for a slip fit. The eccentric cam design of its inner ring and collar makes locking action positive with a twist of the wrist. No lock nuts or adapters are needed. No adjustments of any kind are necessary. The bearing can't be cramped or overloaded when mounting.

If you are looking for a way to cut assembly costs, maybe Fafnir can help you through better, more economical use of bearings. The Fafnir Bearing Company, New Britain, Conn.

MOST COMPLETE LINE IN AMERICA

FAFNIR BALL BEARINGS

Technical Outlook

PLENTY OF POWDER PARTS—The automobile industry produced more than 500 million parts with powder metallurgy methods in 1954. To supply this mushrooming growth, the powdered metal producers sold more than 35 million lb of iron powder alone.

AUTOMATED ULTRASONICS—It's now possible to make ultrasonic inspection a routine, assembly-line operation. Sperry Gyroscope recently showed a machine that can be preset for thickness measurements, defect tolerances and other test readings. Lights or buzzers signal the operator or even halt the operation of the line. Or the whole system can be rigged to record all data and operate automatically.

DOUBLE DUTY—You may be able to use one special machine for two jobs and let the machine set up the operations automatically. One company is machining two different castings as if they were the same. The castings have a like surface, used for locating and clamping. Otherwise, styli on the machine heads detect which type casting is in position and perform the operations accordingly.

NEW ROLE—Roll turning of formed shapes already has a good start (see STEEL, Mar. 29, 1954, p. 120, and Aug. 2, 1954, p. 90). A second cousin to spinning, this method of converting sheet into severe shapes is ordinarily done on a lathe-like machine. Now Bullard Machine Tool Co. is modifying one of its vertical turret lathes to roll turn aircraft parts.

ELECTRONIC SUPERVISOR—With no one near it, a new central control system developed by International Business Machines can switch on or off 40 groups of remote operations, each on its own time schedule. It makes no difference what the electrical service may be . . . lights, motors, heaters, even the plant whistle . . . the system operates over existing electrical circuits by means of carrier current signals. Coded relays at each service or groups of services accept only the electrical impulse that is scheduled to put them into operation.

ONE COAT COVERS—Want a tough vinyl coating that is especially good in corrosion protection of sharp edges, corners, threaded edges, etc.? A new coating has a nonvolatile content nearly twice that of other vinyl maintenance coatings. You can apply a 10-mil-thick coating in one double-pass spray coat. The dense, highly impermeable mastic does not flow away from edges which are particularly susceptible to corrosive attack.

HOW MUCH RESEARCH—Best guess at the total cost of research for 1955 is $4.1 billion. Of this, the armed services will spend $1.3 billion, other government agencies $0.8 billion and private industry about $2 billion. A favorable tax situation and convincing proof that it pays off in production are two big reasons why industry's share has been growing in recent years.

TITANIUM FOLLOW UP—Two new titanium alloys are now available from Mallory-Sharon. One of them (MST 6A1 -4V) is the heat treatable, high-strength alloy mentioned on this page last week. Developed by Armour Research Foundation, its tensiles can go as high as 190,000 psi. The other alloy, a Battelle development, is a nonstrategic, high-strength material whose properties can be varied predictably by heat treatment. Termed the 3 manganese complex alloy, this one was in development for more than two years.

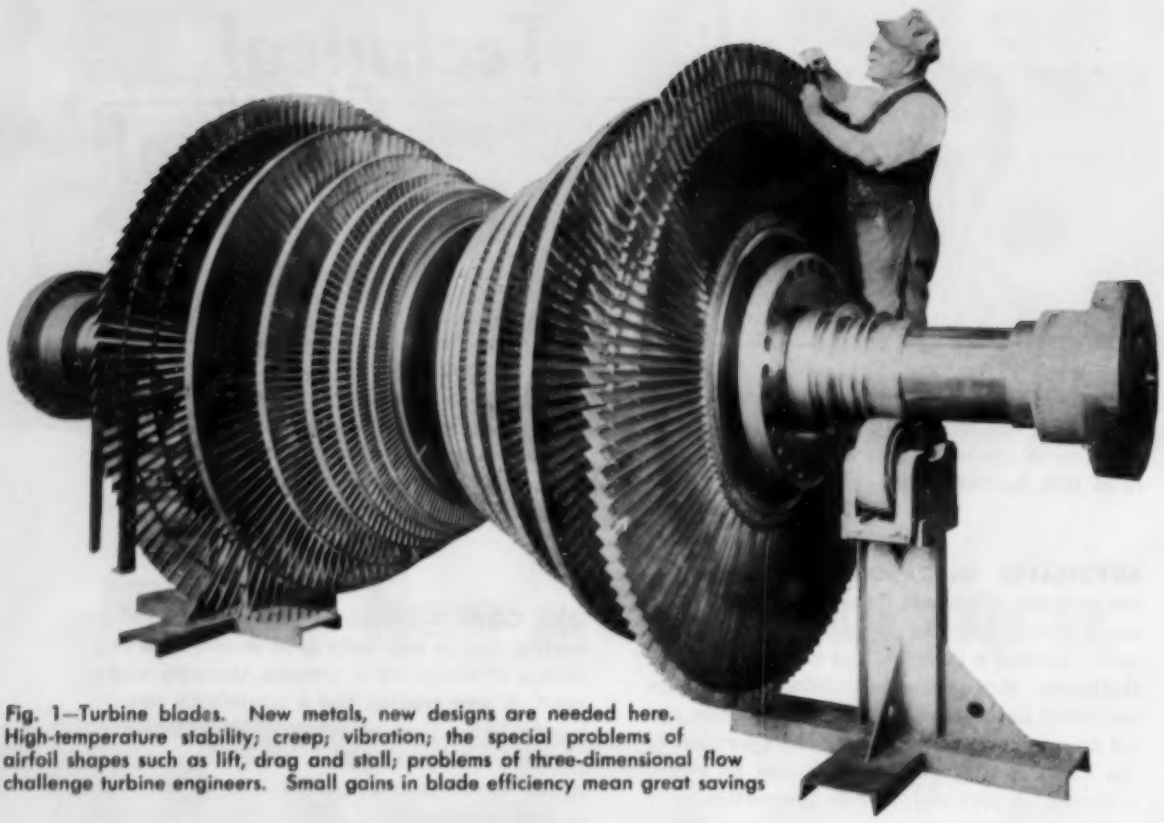


Fig. 1—Turbine blades. New metals, new designs are needed here. High-temperature stability; creep; vibration; the special problems of airfoil shapes such as lift, drag and stall; problems of three-dimensional flow challenge turbine engineers. Small gains in blade efficiency mean great savings

Turbines and Tomorrow's Metals

WHAT HAPPENS to metals in the next ten years is going to make a lot of difference to turbines—and vice versa.

The way population and electric power consumption are growing, we must double our generating and distributing capacity by 1965. For turbines and the materials that go into them, the pressure is on.

Up to now, generating capacity has been increased by building larger and larger turbines for operation at higher and higher steam conditions. For a long time, the trend to larger ratings led automatically to increased efficiencies, but this gain in efficiency has just about leveled off at the largest units being built today. Now we must look to higher temperatures and pressures for further gains in efficiency.

Gas Turbine—For some gains we can also look to the gas turbine. This newcomer to the power field is used mostly for generating electric power at isolated sites or for driving natural gas line compressors. Notwithstanding its present slow acceptance, the gas turbine (according to good indications) will become a major factor in power generation for ratings between 1000 and 15,000 kw during the next ten years. This doesn't imply that the gas turbine will supplant either the diesel engine or the steam turbine. It will, however, greatly supplement their use in the above range.

Research — Reaction of turbine builders to the challenge is typified by the $6-million steam and gas-turbine development laboratory Westinghouse Electric Corp. has just opened at South Philadelphia, Pa. The need for more efficient turbines has put a premium on research and development.

Especially in metallurgy the problems to be surmounted are huge. The modern steam turbine taxes the strength and durability of metals and alloys as greatly as any existing machine. Blading materials must not only possess strength to resist stretching or creeping under loads imposed by steam and centrifugal force but also must have the ability to take pulsating loads without producing dangerous vibrations (Figs. 1-2).

Punishment — In addition to heavy loads and vibration-induced stresses, metals for blading in the condensing end of a turbine are subject to erosive action of water droplets forming in the steam

stream. The impact on the blade tips is comparable to rain beating a jet plane's wings at supersonic speeds.

At the other end of the turbine from this needle-spray shower are inlet steam piping, valves and nozzles glowing at red heat but still expected to safely contain steam at more than 300 times atmospheric pressure.

Austenitic — The step above 1050°F in turbine design is an important milestone to the metallurgical engineer, since 1050°F marks the approximate maximum temperature at which the currently used ferritic alloy steels possess useful strength. The next step is to employ austenitic steels that are stronger and more creep resistant than ferritic materials at elevated temperatures (Fig. 3).

By the addition of alloying elements, such as 18 per cent chromium and 8 per cent nickel, the normal high-temperature austenitic structure of iron can be stabilized so that it will not transform back to a ferrite structure on cooling below 1670°F. The stainless steels modified with molybdenum and/or columbium that are currently used for steam piping and valves on 1050 and 1100°F turbines are austenitic alloys.

Goals—Let's look farther ahead. Designers are working on turbines for 1200°F. Research and development engineers are talking 1250 and even 1350°F. Gas turbine engineers talk even higher temperatures: 1800 and 2000°F. These temperatures aren't here; they represent long-range goals.

Designers are looking to the superalloys to contain these higher temperatures, but the austenitic alloys employed still have useful strength above present day operating temperatures (Fig. 3). If well-designed cooling systems are used, these materials probably will not be made obsolete by the more exotic alloys for a long time.

Coldworking — The superalloys of the first group in Fig. 3 have an austenitic base and depend on coldworking for their strength. This group has good properties in the 1100 to 1300°F temperature range, but the necessity for work hardening restricts its application. It appears impractical, for example, to work harden a massive forging such as might be required for a turbine rotor.

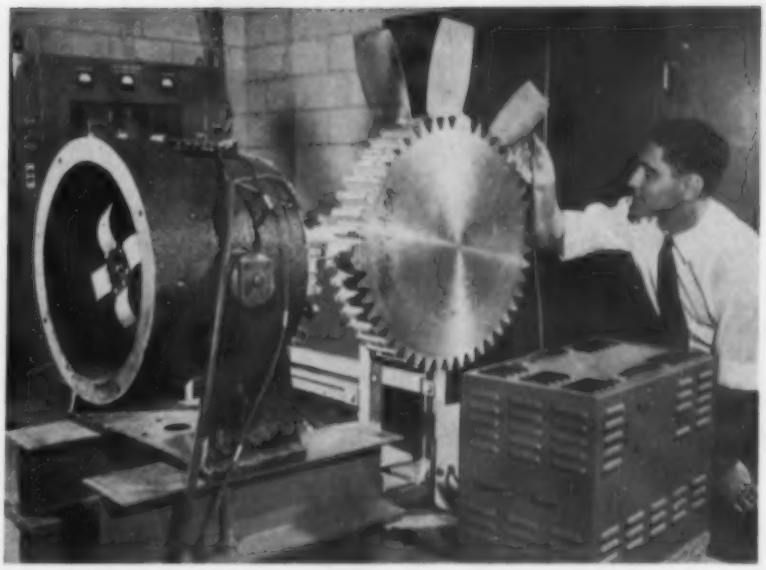


Fig 2—Measuring turbine blade vibration in the new Westinghouse turbine research and development laboratory

Next Choice—The second class of superalloys appears more promising in that strength is achieved by precipitation hardening (Fig. 3). We will probably look to this group for the high-temperature elements of turbines during the next phase of progress.

Westinghouse's K42B alloy, which has accumulated considerable service experience in bolting, is an example of this alloy group and will be the first of the superalloys to see service as a blading material in a Westinghouse electric utility steam turbine.

The often unmachinable, unforgeable cast superalloys in the temperature range of 1350 to 1700°F have inspired profitable development in the old art of lost wax casting. It often is employed

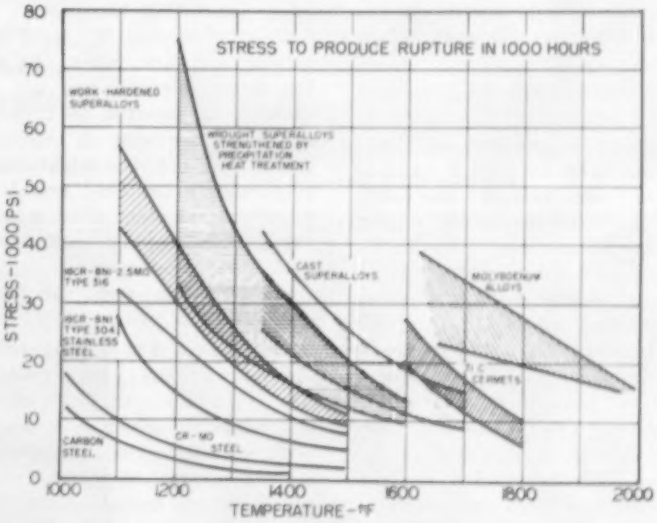


Fig. 3—Strength of materials under stress above 1000°F

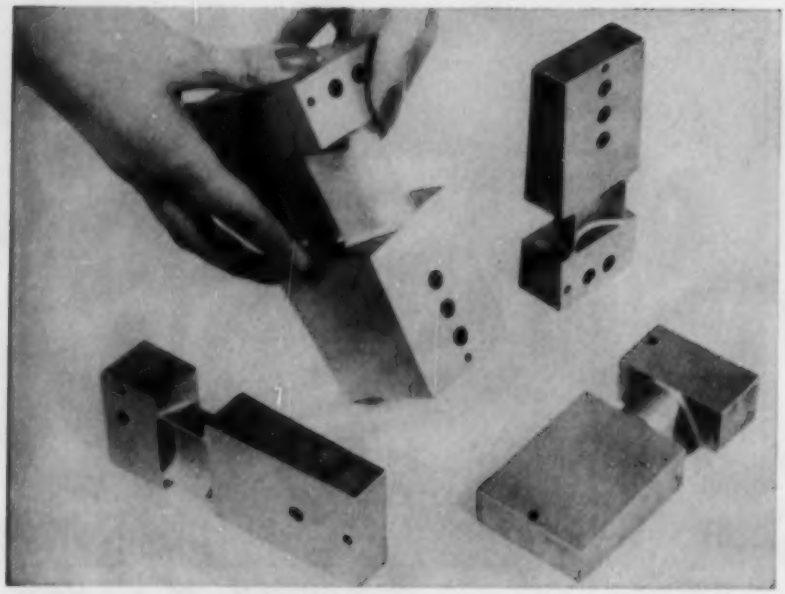


Fig. 4—Triple-impulse turbine blade fabricated by furnace brazing three machined parts together

as an economical means of making gas turbine blade shapes.

Cermets—Strength data for titanium carbide cermets bonded with nickel-base alloys also are plotted in Fig. 3. These are usually unmachinable except with diamond grinding wheels but frequently can be shaped before sintering by conventional methods.

The first cermets produced were brittle as glass, but recent materials show creep-rupture ductility approaching that of some superalloys. Cermets will probably find their way into service in gas turbine stationary elements before long.

Moly Alloys—The creep-rupture strength of some of the molybdenum alloys at temperatures ranging from 1700 to 2000°F exceeds that of our present austenitic steels at temperatures 500°F lower. In addition, molybdenum alloys possess excellent high-temperature ductility—they behave in a much more metallic fashion than the cermets. The principal characteristic that prevents molybdenum alloys from being the panacea for 1800 to 2000°F service is their lack of oxidation resistance. When heated in air, molybdenum will start to oxidize at temperatures as low as 750°F and disappear rapidly as a white smoke at 1300°F.

The development of an oxidation-resistant molybdenum-base alloy or sheath for cladding offers a real challenge to the physical metallurgist. Even if the molybdenum alloys never find their way into widespread use, information gained on the flow and fracture of metals during research work on molybdenum may lead to more rapid use of other high-temperature materials.

Payoff Point—The precipitation-hardened Westinghouse high-temperature alloys, Discaloy, Refractaloy and K42B, which have performed admirably in gas turbine service and are being evaluated for steam turbine use, are outgrowths of research on high-temperature members of electronic tubes. Recent investigations on magnetostriction hold promise of a turbine blading alloy with vibrational damping capacity at 1350°F as good as that of 12 per cent chromium steels at today's operating temperatures.

Brazing — Fabricating process development may also determine whether a new alloy has a successful industrial career or is destined to be a metallurgist's paperweight. As one example of recent developments in the metals-joining field, a triple-impulse blade has been fabricated by furnace brazing three machined blade elements together, using a nickel-chromium-base brazing alloy (Fig. 4).

Furnace brazing is not new, but the development of high-temperature brazing and refinements in furnace atmosphere control have made possible exploitation of this process in joining parts for high temperature service.

Combustion—Some problems of materials and fabrication are shared in common by steam and gas turbines, but gas turbines also have problems peculiarly their own. Combustion is a critical one.

The combustor, heart of the gas turbine power plant, is the stainless steel tube containing the flame. Air enters into reaction with the fuel injected into the upstream end of the combustor, and the resulting temperatures—about 3000°F—are much above the operating temperatures of present turbine materials. Secondary air must be admitted downstream to reduce the temperature to the 1400 to 1500°F for which gas turbines are currently designed.

Residues—Coke deposition within the combustor is another problem. Coke will affect the symmetry of the flow in the burner and cause failure from local hot spots and high thermal stresses in the walls.

Even more of a problem is the corrosion of blade materials from oil ash formed during combustion. Turbine blades disintegrate at high temperatures after only 50 hours of exposure in 1600°F exhaust gases of certain residual oils.

The high corrosion rate is attributed to vanadium pentoxide and sodium sulphate formed during combustion. Both in their molten states are highly corrosive. Unfortunately, their molten-state temperature range is the same as the turbine-operating temperature of 1200 to 1650° F.

Attack—One immediate solution is the use of residual oil with suitable ash characteristics or modification of fuels by oil additives that increase the melting temperature of the ash to above the turbine-operating temperature. Other lines of attack: New turbine and blade alloys, blade plating and blade coatings that will be free from vanadium or sodium corrosion.

Finishing Goes Automatic

ONLY 53 minutes after a raw metal part enters the washer at Detroit-Michigan Stove Co., Detroit, it is being assembled into a new stove. During that time it has taken a trip in the dark through a $100,000 tunnel system and has been cleaned, painted and dried in the process.

First stop on the trip is an Alvey-Ferguson automatic four-stage washer. In 8 minutes parts get a wash, 2 neutralizing rinses and are dried.

Coming out of the washer, parts are hung on an overhead monorail conveyor and enter a Flow Coat chamber consisting of a 10 ft vestibule, 4 ft flood zone and 4 ft exit chamber. Here 150 nozzles deluge the parts with paint at a rate of 150 gpm. Paint viscosity and temperature are automatically controlled.

To the Roof—Leaving the paint chamber the conveyor rises 30 ft through a tunnel to the roof of the plant where it enters a 20 ft square drain and drip chamber. Parts traverse the chamber three times, remaining 12 minutes in 100 to 120°F heat. A saturated atmosphere prevents too quick drying.

Exit from the drip chamber is into another tunnel through which parts move 26 ft to an oven on the roof of an adjoining building. They travel the length of the 57 ft oven 4½ times in 450°F heat before entering a final tunnel leading down to the production line.

Protection—A fully automatic CO_2 fire protection system stands guard in the tunnels and compartments. It not only smothers fire, but also shuts off the gas and air to the oven burners if temperature rises into the danger zone.

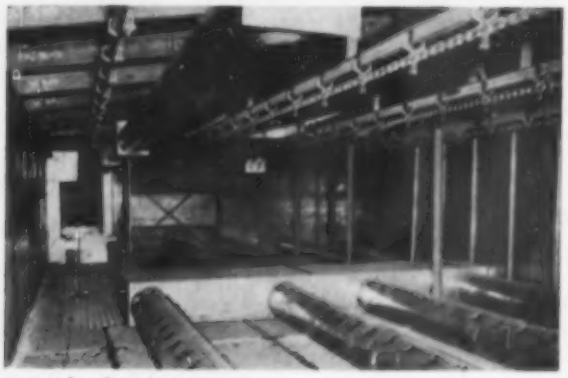
The operational scheme is the conception of Mr. O. R. Candler, Detroit-Michigan vice-president in charge of manufacturing and Mr. B. D. Reedy, factory superintendent. Spray-Con, Chicago, and Glidden Corp. worked out technical details.

1. Automatic washing machine

2. Flow Coat chamber entrance

3. In the drip and drain chamber

5. Drip chamber and oven on the roof



4. Inside the drying oven

Parts from "machining" are hardened, then conveyor takes them through tempering oven to next machining operation. It's straight line production, one example of . . .

What's Ahead In Heat Treating

"WE ARE mechanization minded . . . the trend is to place our heat treating right in the machining departments to give a steady flow of material from the raw stock to the finished product."

This is Robert T. Morken, Chrysler Corp., speaking to the Industrial Heating Equipment Association at its meeting recently in Detroit. He gave furnace makers a look into the future of heat-treating in the automobile industry.

In-line production heat treating spells the end of the operation in an isolated area or separate department. New demands are made on heat treating equipment: Like other machines on the line, its down time must be kept at a minimum.

"We would like for furnace manufacturers to think in terms of simplifying mechanical functions of furnaces . . . more foolproof mechanisms . . . more thought on location of access doors to reach parts requiring replacement."

Vestibules, Too—Here's another point raised by Mr. Morken: It seems to be common practice to build a well constructed furnace and give insufficient thought to the vestibules.

Quite often, limit switches or other parts necessary to the functioning of the furnace are fastened to the vestibules. Lack of attention to vestibule and door construction gives us more difficulty in keeping furnace equipment in operation than any single factor.

Higher Temperatures—Greatest replacement problems come from deterioration of high temperature alloys and refractories. Unless improvements are made, problems in this area will increase because future requirements are going to demand higher temperatures than are used today.

Chrysler is getting ready to build a furnace to operate at 3500°F. This unit could be the pattern for many more to follow. In several operations started in the past two years temperatures ranging from 2000 to 2600°F are used.

Hydraulics—It is common practice to perform mechanical functions on furnace equipment with rather elaborate hydraulic systems. Here's what Mr. Morken had to say on this:

"I see a definite trend away from this type thinking and a movement toward performing these functions mechanically." Reasons: Fire hazards and the large amount of maintenance needed to keep hy-

draulic systems in operation.

A great area of cost cutting in heat treating lies in direction of reduced distortion. "We can no longer think of distortion as inevitable. Ways must be found to minimize and even overcome it."

The solution to distortion problems is multifold and requires a lot of engineering. Special quenching systems and work holding fixtures and more uniform temperatures all help.

Control—Chrysler has used die quenching or roll quenching to reduce distortion. These measures, according to Mr. Morken, do not control distortion; they compensate for it and quite often they overcompensate.

It is impossible to design quenching dies that take into account the tolerances allowable in machining. Because such devices are not entirely satisfactory and since they require much maintenance, more effort will be made to control distortion by marquenching and austempering.

Oils at temperatures up to 400°F and salt at temperatures from 350 to 1100°F are used as quenching media for these processes.

Chrysler is austempering critical parts on a production line basis with a high degree of success. The result is freedom from distortion and physical properties unattainable in any other way.

No Grinding—Several automotive transmission plants are marquenching highly stressed gears to such accuracy that no grinding or lapping is needed after heat treatment.

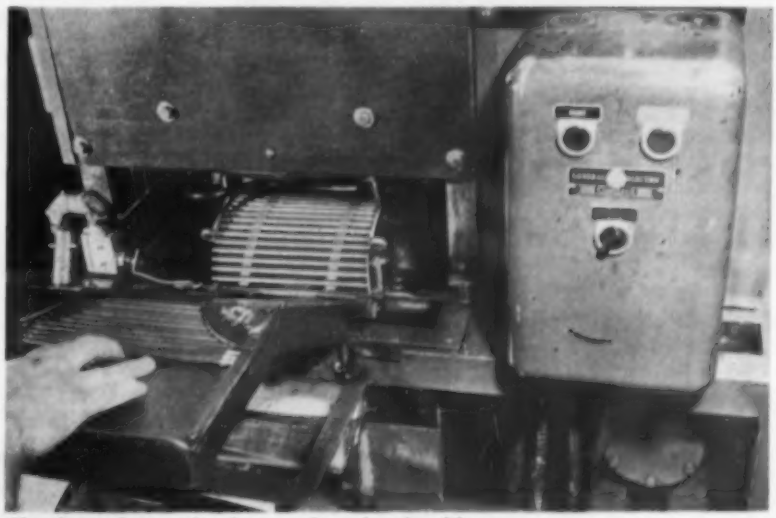
Engineering requirements on automotive parts are demanding closer and closer tolerances from the manufacturing divisions. Machine tool builders are being asked to design machines to fulfill more precise requirements. Heat treating must meet the challenge too.

Controls—We are approaching an era in which laboratory techniques will be applied to manufacturing processes. This means more precise equipment.

Automatic carbon controls being developed will help here. They answer a need that heat treaters have been unable to solve by any other method except the empirical. Such trial and error methods have

Auto flywheel ring is flame hardened on gas fired machine

Pinion gears are treated at Chrysler's Lynch Road plant



Chrysler induction hardens push rod valve lifters

no place in present day manufacturing.

Thinner Cases—There is a decided trend toward lower case depths in carburized parts, said Mr. Morken.

"Long carburizing furnaces do not lend themselves to shallow case carburizing because the time required to complete the mechanical operations exceeds the allowable cycle time to meet case depth requirements."

There seem to be two ways of gaining flexibility here:

1. Furnaces can be constructed wider than customary. 2. Groups of mechanized batch furnaces can be used. The latter seems to offer the most promise.

Cheaper Alloys — What about metals? Mr. Morken said he sees a trend away from more expensive highly alloyed steel toward lower alloy and plain carbon steels.

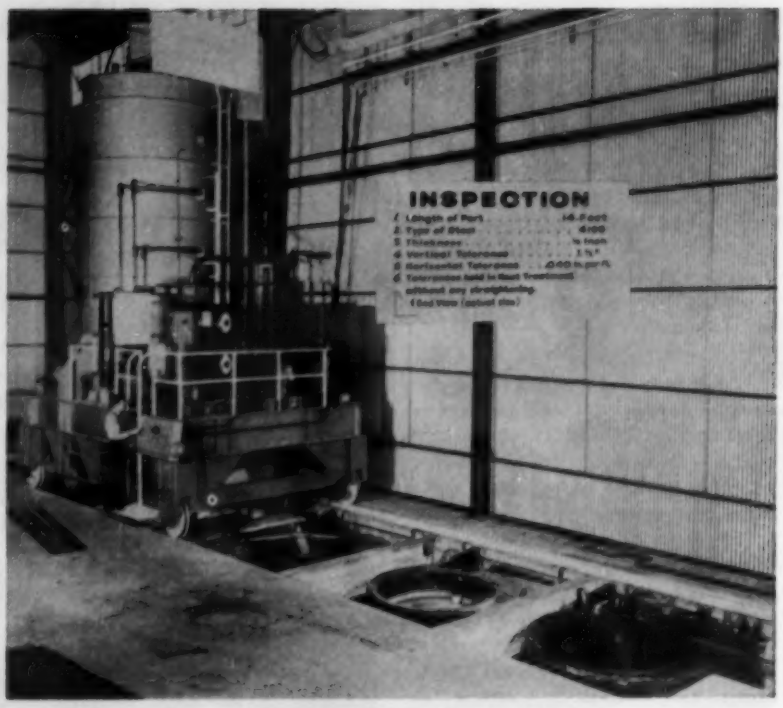
In a number of cases, Chrysler is using a low alloy steel, induction or flame hardened, with a better quality product than the former high alloy materials hardened throughout the cross section.

Both induction and flame hardening fit into the automation picture. The equipment remains relatively cold. This means it's easy to tool the mechanical operations.

This type equipment lends itself to straight line production. The operator receives the piece from the machine operation, hardens it, then hangs the part on a continuous conveyer which takes it through the tempering oven, and it's removed by the operator of the next machine tool.

More Heat — Mechanization of forging will require more continuous furnace equipment. Mr. Morken said that the feeling at Chrysler is that this equipment should be self-unloading, so that if the forging operation for any reason is shut down, the furnace will automatically unload itself and prevent burning of the billets.

Large tonnages of metal are handled in forging. Furnaces are needed that heat more rapidly. The faster heating rate minimizes metal loss through scale formation. It lets the manufacturer keep pace with highly mechanized forging presses.



Vertical heating, salt quenching keep . . .

Heat Treating

Distortion at a Minimum

A LARGE drop-bottom furnace going into operation at a Minneapolis heat treating plant was built to handle extra long parts with minimum distortion.

The principle of the furnace which is installed at Metallurgical, Inc., is vertical heating, then quenching in a 22 ft deep agitated salt bath. The hot salt quench, compared with oil quenching, cuts distortion up to 90 per cent.

Designed by Loftus Engineering Corp., Pittsburgh, the furnace hardens, anneals, stress relieves and normalizes steel and aluminum aircraft parts (machine tool manufacturers are interested, too). Controlled endothermic or neutralene atmosphere eliminates scaling and gives bright work. Instruments control temperature within ±5 to 2200°F.

On Tracks — The furnace is mounted on a carriage and moves along tracks over a pit which is 25 ft deep by 60 ft long. In the pit are three agitator-type quench tanks containing water, martempering oil or hot salt.

Capacity of the water and oil tanks is 6300 gal each. The hot salt quench uses 105,000 lb of molten salt. Working space in the furnace is 9½-ft wide and 22 ft high. Its own self-contained crane is in a gas tight housing.

Here's How—Parts to be hardened are suspended from a fixture in the loading end of the pit. They are hoisted into the furnace through the bottom and brought up to temperature.

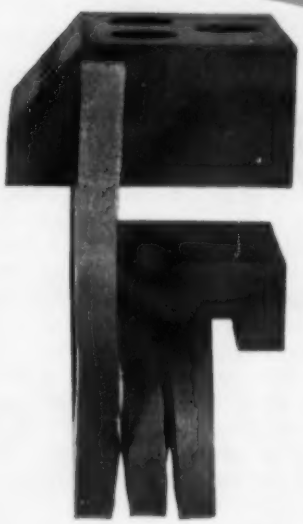
When it's time to quench, the operator moves the furnace over the desired quench—oil, water or hot salt—and the load goes in at rate of 1 to 10 ft a second. The furnace then returns to the loading station.

I-T-E

SAVES MONEY BY USING

Revere Extruded Shapes

PROBABLY YOU CAN TOO!



Overload device, OD-2, made by I-T-E Circuit Breaker Company, 19th & Hamilton Sts., Philadelphia, Pa., using Revere Copper Extruded Shapes.

Actuating mechanism, showing overload coil brazed to two Revere Extruded Shapes.

Here is a photograph of the I-T-E Dual Selective Overcurrent Trip, an air circuit breaker part. It contains two Revere Extruded Shapes, in copper. In the detail view, the beveled shape at the top is furnished in Free-Cutting Copper, to speed up the drilling and tapping of the holes. The piece below it was originally milled from rectangular copper bar, 1 x 2 inches. The bar weighed 7¾ lbs per foot, and 1.8 lb of scrap per foot was generated in machining it to the angular form shown. The company then switched to a Revere Extruded Shape, weighing a little less than 6 lbs per foot. Though the shape inevitably costs more per pound than the bar, the reduction in weight was sufficient to save almost 44¢ per foot over the bar, and of course additional savings were realized in reduced machining time and in scrap handling. Production also was speeded up. This is an outstanding example of the economies offered by shapes.

Look into extruded shapes, in copper and copper-base alloys, and aluminum alloys. The nearest Revere Sales Office will be glad to explore the subject with you.

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Burdening the Blast Furnace

It's going to take more than the improvement of the individual components of the burden to up furnace output. Distribution and gas-permeability needs attention, too

By M. W. LIGHTNER
Assistant Vice President
Research and Technology
U. S. Steel Corp.
Pittsburgh

Extra copies of this and the other three installments are available in limited quantities from STEEL, Reader Service, Penton Bldg., Cleveland 13, O.

EFFICIENT functioning of the reducing reactions within the blast furnace undoubtedly depends to a large extent upon the permeability of the descending solids to the rising gases. The term "permeability" as applied to the study of the flow of gas through beds of granular solids implies the ease with which the gas can penetrate the bed.

Actually, what is usually measured is the resistance of the gas to flow through the bed, the so-called "pressure drop," which is the reciprocal of permeability. Insofar as the blast furnace is concerned, a high blast pressure with a low top pressure and a constant wind rate indicates a high pressure drop in the shaft and a low permeability of the burden.

Comparing Permeability—In the U. S. Steel Applied Research laboratories it was found that by measuring pressure drop at a fixed wind rate, the permeability of various burden materials could be compared. Coke finer than 1 in. in size severely reduced the permeability of blast-furnace burdens (see Fig. 8); an increase of 10 per cent of coke finer than 1 in. increased the pressure drop through the burden by 45 per cent.

In similar tests on strong and weak coke before and after being subjected to the standard shatter test, other researchers found that the pressure drop increased markedly with an increase in coke fines, too.

Removing the extremely fine fraction from the ore was found to be of little value in increasing permeability. However, screening the ore at 4-mesh lowered the pressure drop by more than 14 per cent. The effect of agglomeration such as sintering and pelletizing and of screening of fines is shown in Fig. 9. Another study of sinter burdens showed a pronounced effect of increasing percentages of ¼-in. sinter upon increasing pressure drop for a given rate of air blow (Fig. 10).

Correct Distribution—For many years, blast - furnace operators have been aware that one of the most important factors affecting furnace operation and the efficiency of the ironmaking process is the distribution of the charged materials in the stock column. Localization of fine materials in various parts of the shaft prevents uniform penetration and results in material reaching the hearth too cold and unprepared for smelting.

When the resistance to flow of gas through zones high in iron ore is too great, the over-all wind rate is reduced and channeling of

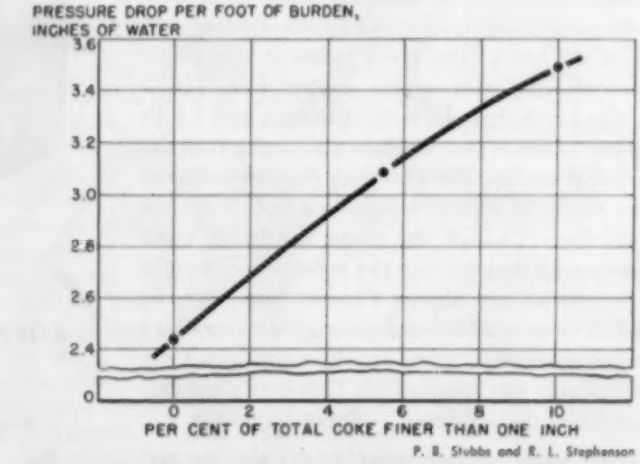

Fig. 8—Effect of minus 1-inch coke on pressure drop through a complete blast furnace burden (wind rate 5 ft/sec)

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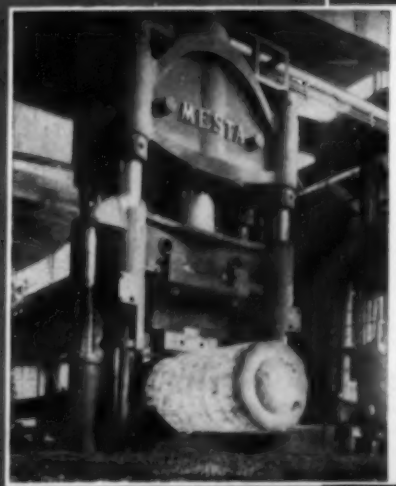

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TABLE VI—Effect of size of ore unit on distribution, normal charging sequence

Volume of ore unit in blast furnace model, cu in.	Equivalent weight of ore unit in full-scale furnace, lb	Ore in each annular section of blast furnace model, % Distance from furnace inwall, inches				
		0-1	1-2	2-3	3-4	4-center
18.2	20,000	70.1	59.6	46.7	22.6	6.8
26.8	30,000	66.3	59.8	49.9	30.9	7.6
45.0	50,000	64.3	56.4	52.4	45.3	26.2

R. L. Stephenson and F. C. Langenberg

the gas occurs through the paths of least resistance, thereby lessening the efficiency of the gases both thermally and chemically.

Closer Look—It is obvious that when the charge is dumped from the large bell, the contour of the surface of the deposited ore and coke is V-shaped. As a result, the fine material tends to stay in place as deposited near the inwall, the coarse material rolls to the center of the furnace, and the velocity of the gas will vary greatly at different points in the plane.

A comprehensive study of the stock column showed that gas velocities in the column of a 700-ton furnace operating on Mesabi ores, varied from 74 to 439 fps at a point 3 feet below the normal stockline; the highest velocity being at the center of the furnace and the lowest velocity being at the inwall.

Even though the distribution may be irregular at the stockline there is a tendency for the differences in size to even out as the burden descends. At approximately 20 ft below the stockline the size distribution may be uniform.

Models Disclose Pattern — Use of models to show the effect on distribution of some of the operating and design variables was employed as early as 1930. Among other things, it was found that the size of particles in the center relative to those at the periphery is decreased by shortening the time required to deposit material on the bed.

In the U. S. Steel Corp. Applied Research lab, studies were conducted using a transparent lucite model of a blast-furnace top constructed to the scale ½-in. = 1 ft. Concentric cutters were used so that the material could be divided into five annular sections to determine the size consist at the various locations. Distribution studies were made using sized ore and coke; limestone was not used since it constitutes only a small percentage of the burden.

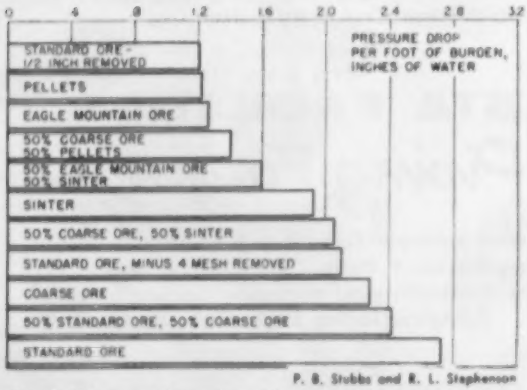
Actual Tests—Prior to blowing in a furnace after relining, a folding scaffold on which a Plexiglass divider had been built was suspended in the throat of the furnace. After the ore, coke and stone were deposited on the platform according to the conditions under study, half of the charge was dropped into the lower levels of the furnace by lowering one side of the scaffold.

Thus the other portion could be studied through the partition. These tests showed a remarkable similarity to the model tests under the same conditions.

Deposited in Layers — It was found in the model studies that, when the normal charging sequence was used, the ore and coke appeared to separate into layers. The analyses of the annular sections of the column (table VI) showed that the proportion of ore in the central part of the furnace increased, and at the same time, the proportion of ore near the inwall decreased as the size of the ore unit increased.

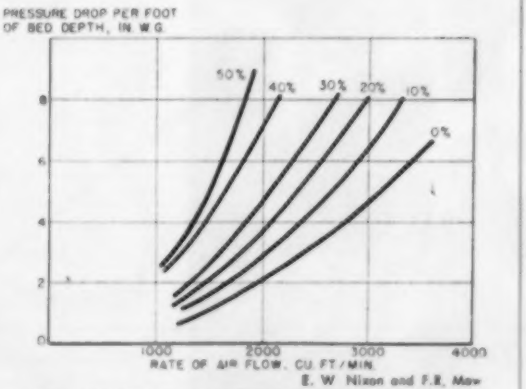
Some of the conclusions that might be drawn from the results of this work to date are:

1. With normal charging the size of the ore unit governs the distribution; the larger the unit the more uniform the distribution across the furnace.
2. Raising the stockline above



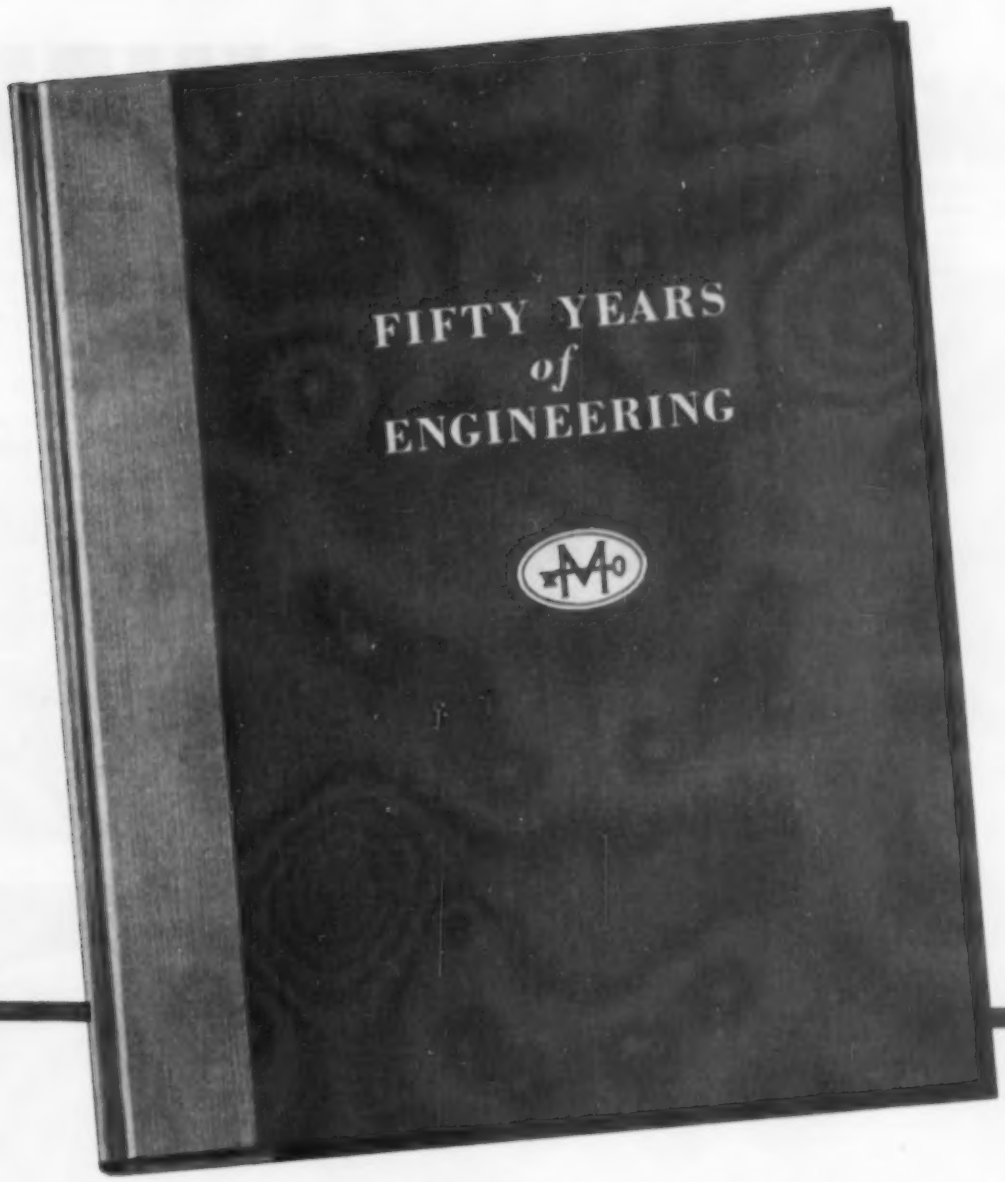
P. B. Stubbs and R. L. Stephenson

Fig. 9—Pressure drop through various beneficiated blast furnace burdens



E. W. Nixon and F.E. Mav

Fig. 10—Effect of percentage of minus ¼-inch size fraction in sinter



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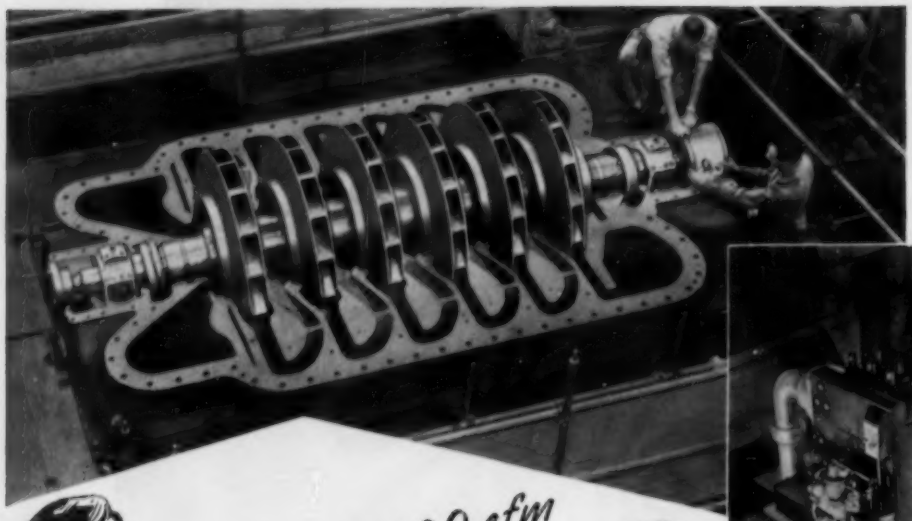
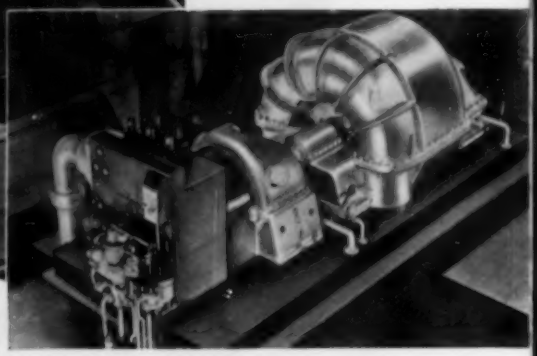
What type BLOWER



Typical centrifugal blower with upper half of casing removed.



75,000-cfm, 30-psig blast furnace blower.

Typical axial compressor of blast furnace size.

Blast furnace type axial compressor with upper half of casing removed.

ALLIS-

STEEL

for your steel mill?

As requirements move above 100,000 cfm, axial compressor may replace centrifugal blower because of higher efficiency and lower operating cost. Allis-Chalmers experience with both types assures you of sound recommendations.

Battling rising costs, blast furnace designers have sought increased economy through larger blast furnaces. Air requirements of the new units have risen rapidly and have now reached the point where the centrifugal blower is not always the most efficient and economical unit. These are some of the design and operating factors that influence the choice of the best blower for the job:

EFFICIENCY — The axial compressor is inherently more efficient than the centrifugal blower. This is due largely to the fact that the air passing through the centrifugal blower follows a complicated air path, with sharp turns passing from one stage to the next. In an axial compressor, the air path is more nearly a straight line and losses from sharp turns in the air path are avoided.

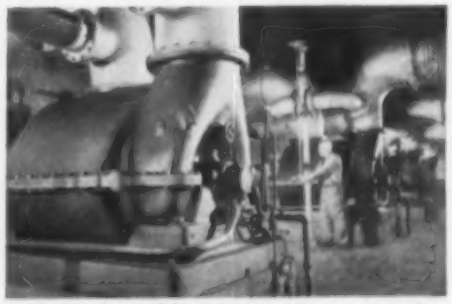
DRIVE UNIT — At 100,000 cfm and above, the speed of a centrifugal blower has dropped below 3600 rpm, while the speed of a comparable axial compressor is approaching 3600 rpm. This difference becomes more pronounced as units get larger. Since the optimum speed of either a turbine or motor drive is about 3600 rpm, the centrifugal makes best use of the drive in smaller sizes, while the axial makes best use of the drive in larger sizes.

SIZE — In all sizes the axial compressor is smaller than a centrifugal blower of the same rating. This means less floor space, smaller foundations, reduced costs.

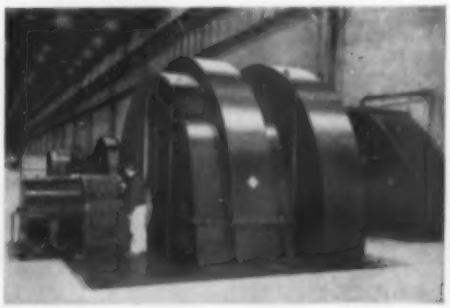
Unbiased Analysis and Recommendations

Since Allis-Chalmers has had wide experience in building both centrifugal and axial types, your Allis-Chalmers representative can help you with your blower problems. Call your nearby Allis-Chalmers District Office or write Allis-Chalmers, Milwaukee 1, Wisconsin.

Other Allis-Chalmers Steel Mill Equipment



Coke Oven Blowers . . . both axial and centrifugal types for booster or exhauster service. Photo shows four 23,000-cfm, 5100-rpm, 35-psig exhausting blowers in western steel mill.



Motors . . . all types of ac and dc steel mill motors. The 3500-hp wound-rotor motor shown is used in conjunction with four 6000-hp synchronous motors driving roughing stands of 80-inch hot-strip mill.

Electric Power Equipment . . . steam turbine-generator units, transformers, switchgear, circuit breakers, rectifiers, control. Shown is a 33,000-kw steam turbine-generator unit with hydrogen-cooled generator supplying power in a modern eastern steel mill.

CHALMERS

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normal level causes more ore to roll to the center.

3. Lowering the stockline below normal level causes more ore to be in the center, probably a result of rebounding from the walls.

4. Reversing the charging sequences by placing coke on the bell first, deposits less ore in the center and slightly more near the periphery of the furnace than by the normal charging sequence.

5. Unit charging has little effect on distribution.

6. Variations in the charging sequence can have an appreciable effect on distribution. For example, the charging sequence of OCOCCC causes more ore to be deposited in the center than OCCOCC (O, ore; C, coke).

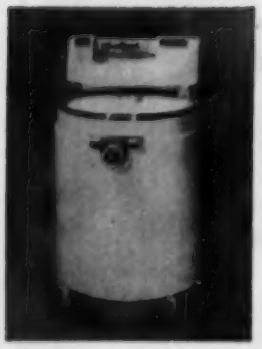
7. Premixing the burden has little effect.

8. An annular batter plate above the stockline armor has little effect.

Quick Summary — Behavior of burdening materials, ore, coke and flux in the blast furnace is not well known because of the extreme difficulty of sampling at various levels in the stock column. Depletion of high-grade ore reserves necessitates the beneficiation of lower-grade iron-bearing minerals such as wash ores and taconite.

As a result, much study will be required in the next decade to develop suitable methods for the agglomeration of fines and to evaluate the performance of the several types of agglomerates in the blast furnace. Likewise, our knowledge of factors affecting coke quality and the effect of blending coals as well as the effect of additives such as char, pitch, coke breeze, etc., upon coke quality and resulting blast-furnace production is limited and much research remains to be done.

The known factors controlling distribution in the stock column have contributed to less hanging of the burden and channeling of gases, but there are many indications that the use of agglomerates will present new distribution problems and may even necessitate alterations of the furnace lines.



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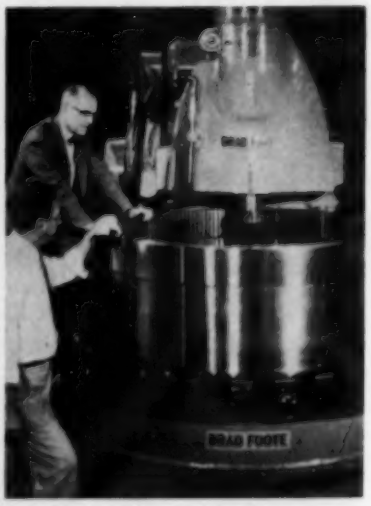
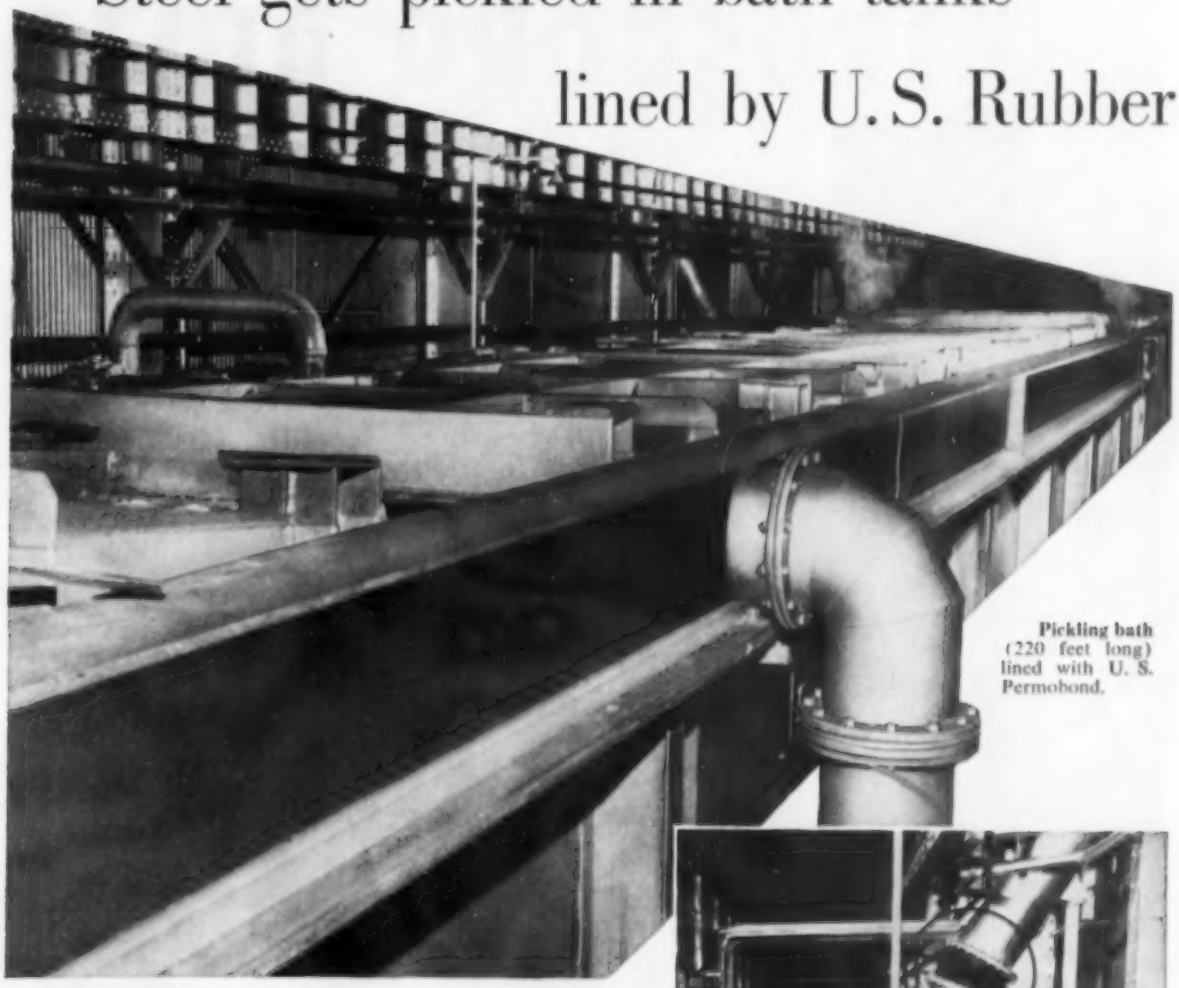


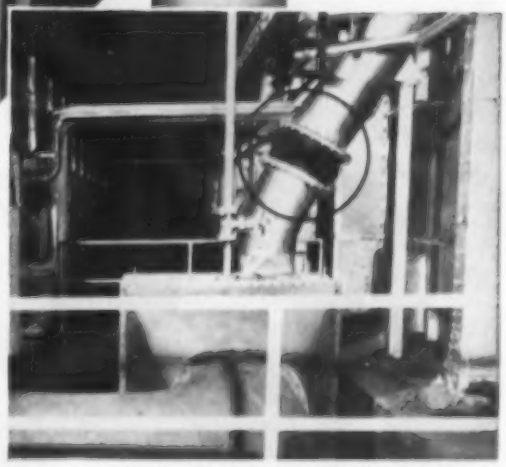
Coupling for Big Breeze

This giant coupling weighs more than 4000 lb, is 24 in. high and has an outside diameter of 58 in. Machined by Brad Foote Gear Works Inc., Chicago, it will become part of a wind tunnel for testing jet aircraft under simulated flight conditions. It was produced on a 100-in. Fellows gear shaper specially designed for the manufacture of couplings

Steel gets pickled in bath tanks lined by U.S. Rubber



Pickling bath (220 feet long) lined with U. S. Permobond.



Duct system lined with U. S. Permobond conveying sulphuric acid fumes to outside of plant. Note U. S. Expansion Joint at right.

Many steel plants handle the hot corrosive acids used in pickling operations by means of tanks lined with Permobond, a product made and installed by United States Rubber Company. Without this rubber, the hot acids would "eat" and corrode the metal tanks.

Typical is this large Midwestern steel plant. The complete pickling unit, acid bath tanks and covers, rinse tanks, fume exhaust system, including a large stack, are all "Permobond-protected."

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The "U. S." complete engineering service which designed, accurately fabricated, and Permobond-lined the many complex weldments into a finished, efficient pickling line is available to all industry. For more information write to address below.

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Mill Slashes Materials Handling Costs

When Allegheny-Ludlum rebuilt its system, everybody profited. There's less back-breaking work, safer conditions and more material storage economy

THE UNSUNG portion of Allegheny-Ludlum's postwar redevelopment program was the revamping of its materials handling setup. Company engineers took the whole system apart; and when they put it back together, raw materials shipping and unloading were speeded up, materials storage was more efficient, and a new coil handling system was installed.

First, all materials flowing through the plant were listed to show how they were handled and stored. Bottlenecks were noted for future reference. Engineers also built scale models of various plant locations, pinpointing new equipment to speed operations.

Quicker Methods — Formerly, material shipped in by boxcar was unloaded by hand. Workers carried bricks from boxcars by wheelbarrow. Bricks were then unloaded and stacked manually.

Fork-lift trucks solved the difficulty. Palletized brick is now unloaded 4000 lb at a time, instead of 100 lb per wheelbarrow load. While it took 64 manhours to unload a boxcar, the same job now requires five manhours.

Safety Factor — Aside from greater speed, new methods of handling raw materials are safer. Once barge shipments of ferrochrome arrived in barrels. With no tool to handle the barrels efficiently, the danger of accidents was always prevalent. Now ferrochrome shipments arrive in tote boxes that can be handled easily and safely.

Tote boxes made by suppliers provide an efficient means of storing ferroalloys at the Brackenridge plant. Box capacities range from 2000 to 4000 lb, and weight of contents is plainly marked on each, which makes it easier to take inventories. Using these boxes and stacking them, A-L engineers estimate they can store twice as much material in half the space it once took.

Other Savers—In some cases the problem of wastage of materials has been solved. Shipments of lime, for instance, used to arrive in bags which frequently collapsed when dropped. Now bags are palletized.

Trucks at Brackenridge are radio-equipped for greater efficiency. But progress has brought an unexpected difficulty which will soon be tackled. The new trucks are so large that they've outgrown the old garages, so new ones are in the planning stages.

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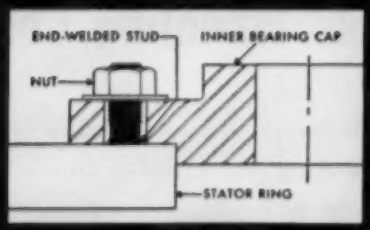

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Aluminum Hits the Road

Giant presses of the aluminum forging industry turn out automobile wheels

FORGED ALUMINUM wheels are standard equipment on the 1955 Cadillac Eldorado. Of an air-cooled, spoke design, they are a "first" on modern passenger cars.

The wheels also are the first major automotive product to be formed on the giant presses of the aluminum forging industry which were installed to produce vital structural sections for aircraft.

Advantages — Aluminum forgings make possible lightweight and extremely strong wheels with surfaces suitable for chrome plating.

The spoke wheel, which allows air to flow through the wheel to cool the brake drum, would have been too heavy if produced from most metals. Lightweight aluminum, formed hot by thousands of tons of pressure from a giant forging press at Aluminum Co. of America's Cleveland works, provided the answer.

Cuts Cost—The precision possible with heavy press forging minimizes machining and finishing operations. At the same time, this precision permits improved tire wear because of its balanced, true-running characteristics.

Kelsey-Hayes Wheel Co., Detroit, will manufacture the wheels for Cadillac. Final design details for the forging were worked out between Cadillac, Kelsey-Hayes and Alcoa engineers.

Aluminum wheels emerge from final forging operations on giant press at Alcoa's Cleveland works

Milling Cost Cutter

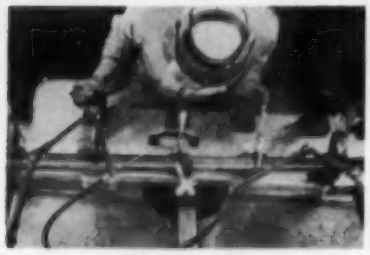
Special tooling on spindle shaper permits high-velocity profile milling of steel

JOB TIME cut 96 per cent: That was the story when a woodworking spindle shaper was used to profile mill the edges of 155-in.-long steel closure ribs for large aircraft.

Floor-to-floor time for rough and finish machining an edge is about 20 minutes. On a standard profiling machine it takes about 10 hours.

The B-52 closure ribs are of modified, SAE 4340 steel (heat-treated to Rc 40-42), 3/32 to ½-in. thick. They are machined at 2062 sfm with a carbide-tipped, 1¾-in. diameter, three-flute end mill.

How It Works — An operator clamps the ribs to an aluminum fixture, the edge of which has been machined to the rib contour. This edge acts as a template and rides along an Ampco bushing mounted on the cutter shank.



PROFILE MILLING
. . . on woodworking spindle shaper

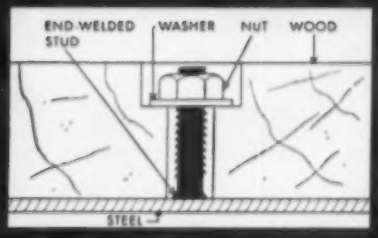
The aircraft company uses two machines in line, with a roller conveyor between them. The operator hand feeds the clamped workpiece into the first or roughing machine which takes a 3/32 to ½-in. depth of cut at 4500 rpm. On this machine the shank mounted bushing is about ⅛-in. larger in diameter than the Kennametal K2S cutter. This leaves about 1/16-in. of stock for finishing.

CO_2 Cooling—The operator then slides the workpiece across to the finishing machine on which the Ampco bushing is the same diameter as the K2S cutter. It requires only 2 minutes to complete each cut. Two streams of CO_2 cool the end mill during the cutting cycle.

"STUD" NELSON
FASTENS
WOOD to STEEL
IN A FLASH!

Shipyards and railroads have long been users of the NELWELD system of securing wood decking—and builders fasten wood nailers the same way.

In like manner, designers of skids, pallets, dollies and other wood-and-steel products are also benefiting by the NELWELD® method. End-welded studs are a "natural" in designing outside surfaces free from bolt heads and projections—saves drilling and tapping the steel members, too.



The pay-off is—NELSON® studs are made in many other different sizes and shapes—allowing design flexibility you never believed possible.

The aim of every Nelson Engineer is to improve fastening and reduce cost. He will arrange a demonstration in your plant or furnish a trial rental unit. Write or phone for details.

Stud Nelson

Fasten it Better at Less Cost with

NELWELD

NELSON STUD WELDING
2715 Toledo Avenue
Lorain, Ohio

Please send more information on stud welding wood to steel, and other cost-saving applications.

NAME_____

COMPANY_____

ADDRESS_____

CITY AND STATE_____

NELSON STUD WELDING DIV OF GREGORY INDUSTRIES INC LORAIN, OHIO

MASS PRODUCTION OF STEEL PRODUCTS at Republic goes beyond fasteners. Take this steel building, for example, made by Republic's Truscon Steel Division. It is one of many standard styles and sizes produced by the world's largest manufacturer of metal building products. Truscon Steel Buildings offer the economies of standardization—plus fire protection, ease and speed of erection, low upkeep, high investment value. They're low in cost and can be disassembled and re-erected as space-needs change.

TIN PLATE IS ANOTHER EXAMPLE OF REPUBLIC'S DIVERSITY of operation. Electrolytic and coke tin plate for all types of cans—food, oil, paint, beverage, etc.,—is made by the cold reduction process which gives all the qualities necessary for making tin containers on high-speed automatic machines. Black plate is also available in standard grades for such applications as lacquered cans and light stampings.

REPUBLIC IS ALSO A MAJOR PRODUCER OF HOT ROLLED BARS, a substantial portion of which are used in forgings, such as these. Forging stock is available in all commercial grades of carbon, alloy and stainless steels. Republic is prepared to supply standard hot rolled shapes as well as special sections.

Types

REPUBLIC MAKES

This selection of fasteners represents only a small part of the more than 20,000 regular types and sizes made and stocked by Republic.

To meet the varied requirements of all types of industry, Republic operates the country's largest, most modern and diversified fastener plant under one roof. Daily capacity is 15,000,000 fasteners. This big-volume production includes everything from machine bolts, cap screws, hot and cold punched nuts to rivets, sheet metal screws, track bolts, alloy studs.

In addition, Republic produces over 8,000 special types and sizes of fasteners—like mine roof bolts,

REPUBLIC

World's Widest Range of Standard

and Sizes?

AND STOCKS OVER 20,000

"Nylok" nuts, high-strength bolts.

Republic takes no chances on quality. It's controlled at every stage of production—from raw materials to finished fastener. Republic uses its own ore, makes its own steel (over 50 analyses of carbon, alloy and stainless), employs the most modern machines and procedures.

If you are interested in quality, uniformity, delivery, dependability, ease of application and long service life—you will get them all in Republic Fasteners.

Contact your industrial distributor. Or mail the coupon for more information.

STEEL

Steels and Steel Products

REPUBLIC STEEL

REPUBLIC STEEL CORPORATION
3120 East 45th Street
Cleveland 27, Ohio

Please send more information on:

☐ Fasteners ☐ Truscon Steel Buildings
☐ Hot Rolled Bars ☐ Tin Plate

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

K-7156

Porous Stainless Gets Play

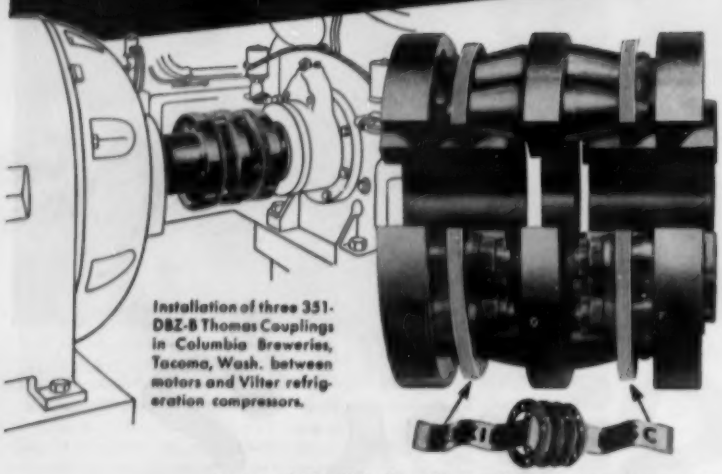
High-strength stainless steel sheet, porous enough to permit air to be blown through it, is finding a place in the aircraft industry. It forms the skin of aircraft wing leading edges to accomplish hot air de-icing.

In a de-icing system for gas turbine powered aircraft, compressor bleed air heated from 400 to 700°F is ducted directly to a chamber extending the full length of the leading edge. Hot air issues from the outer face of the porous skin with almost perfect heat transfer.

The metal retains its strength at temperatures in excess of 600°F and is easily machined or formed. In appearance, porous stainless steel sheet resembles polished aluminum.

It is available in sheets up to 18 by 72 in. from Aircraft Porous Media Inc., Glen Cove, N. Y.

THOMAS FLEXIBLE COUPLINGS...
for more years of better service!



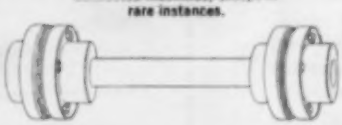
Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.



Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

New clutch assembly makes this press . . .

Fast on the Draw

BY SPEEDING UP the nonwork portion of your press stroke you can boost production of deep-drawn stampings. A recently perfected press has a cycling time roughly twice as fast as a conventional press.

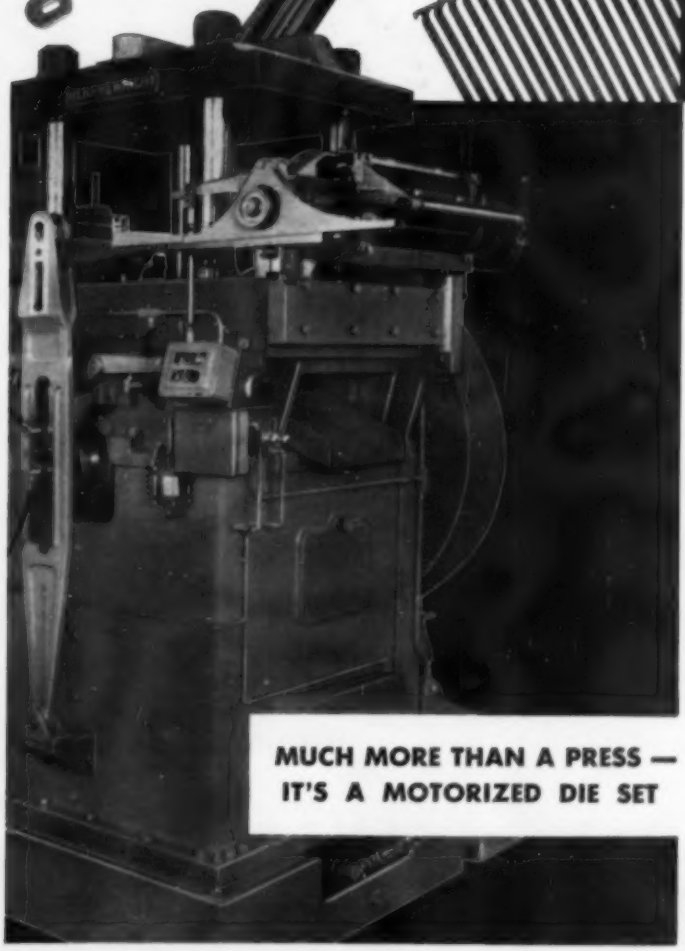
In drawing, the part of the press stroke in which metal is made to flow must be done slowly. And the press must have a long stroke to accommodate removal of parts. This combination makes deep drawing a relatively slow operation.

How It's Done—The Clearomatic press, developed by Clearing Machine Corp., division of U. S. Industries Inc., speeds up the cycling rate with a system of planetary gears in the press clutch.

At start of the press cycle the ring and planetary gear assembly rotates at flywheel speed and the slide approaches the work rapidly. At a predetermined point above the work, the high-speed driving unit automatically disengages and the low-speed unit takes over. Now the driveshaft moves at one-third flywheel speed. This is the working portion of the stroke. When draw is completed, the high-speed unit engages, returning the slide quickly to top stroke.

The point at which drawing speed begins can be changed by an adjustment in the control system to accommodate a number of drawn parts of different depths.

they cost much less to make on HENRY & WRIGHT DIEING MACHINES



MUCH MORE THAN A PRESS — IT'S A MOTORIZED DIE SET

Each Henry & Wright Dieing Machine is a versatile production unit. Want speed alone for straight blanking? You've got it to spare. Want to form, bend, fasten with dependable accuracy? You've got the precision, rigidity, and endurance in the Henry & Wright Dieing Machine to cope with the most difficult progressive jobs. You're ready for any stamping job with Henry & Wrights — *get full details by writing Henry & Wright, Division of Emhart Mfg. Co., 441 Windsor St., Hartford, Connecticut.*

FOR QUALITY IN QUANTITY — STAMP 'EM ON H & W

H&W®

HENRY & WRIGHT

DIVISION OF EMHART MFG. CO.

HARTFORD, CONNECTICUT

Overall view of the new Hot Extrusion plant at Jones & Laughlin Steel Corporation's Pittsburgh Works.

NOW IN PRODUCTION

EXTRUDED SECTIONS

(HOT EXTRUDED and COLD DRAWN)

FROM **J&L's NEW PLANT**

This modern new plant, now in production, can tailor-make Extruded Sections (hot extruded and cold drawn) to your specifications. Here, complex sections that cannot be rolled can be custom-made for you . . . quickly and economically.

J&L's ingenious new equipment makes possible the production of sections that are preformed to the predominating cross section of the part you wish to produce. The range of sections that can be produced is almost unlimited.

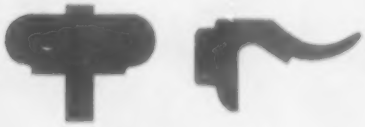
Quantities also are extremely flexible. Even the production of a single extrusion of less than 100 lbs. is practical.

In addition, J&L's Extruded Sections possess the physical benefits and accurate tolerances derived from cold drawing. And, you can obtain them in a wide range of analyses.

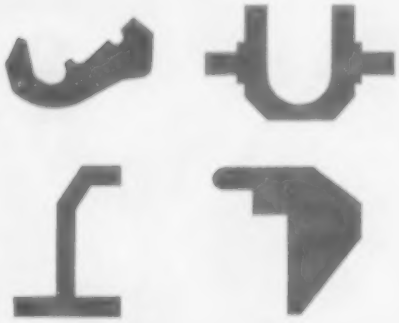
Complete information is available now. Send us your inquiry—today.

Jones & Laughlin
STEEL CORPORATION — *Pittsburgh*

Close-up of the 1000-ton hot extrusion press at Jones & Laughlin Steel Corporation, Pittsburgh. Hot billet is being pushed into the die container. The ram then forces it through the die.



Examples of sections that can be produced to your order. More intricate sections are also possible. The section you need is custom-made to your requirements.



J & L's Extruded Sections help speed your production and reduce your costs

With J&L's Extruded Sections you can:

1. Eliminate time and costs in machining operations.
2. Eliminate time and costs in finishing operations.
3. Reduce scrap losses practically to the zero point.
4. Eliminate the cost of castings and forgings of intricate sections requiring considerable machining.

J&L STEEL

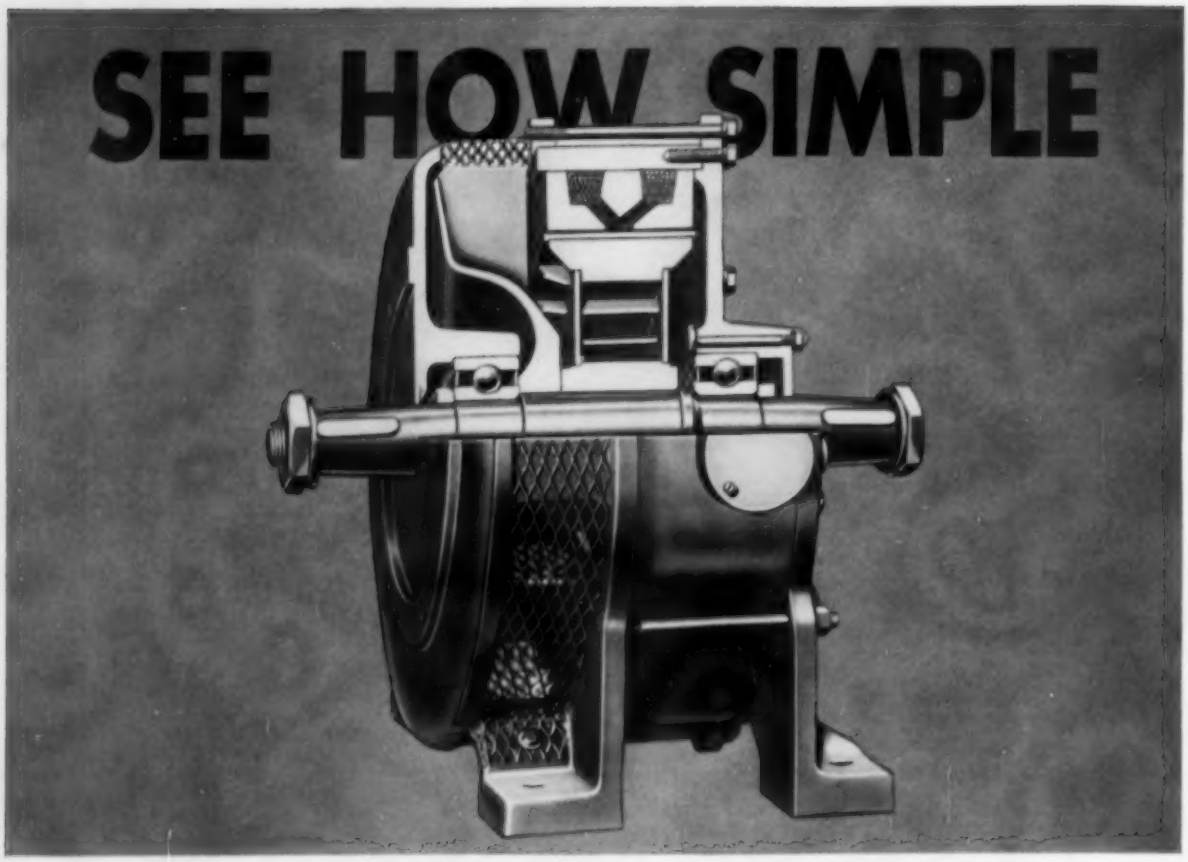
USE THIS HANDY COUPON

Jones & Laughlin Steel Corporation
3 Gateway Center, Dept. 404, Pittsburgh 30, Pa.

I am interested in knowing what your extruded sections can do for me.

Name_____
Company_____
Street_____
City_____ Zone_____ State_____

SEE HOW SIMPLE



... and only P&H overhead cranes have this better AC CONTROL ... MAGNETORQUE*

Here is what all the talk is about in modern crane control. This is the P&H Magnetorque unit . . . so simple it never requires maintenance.

In this AC crane control there are no rotating electrical parts, never any adjustments to make, no replacements ever needed. With Magnetorque, braking forces are exerted electro-magnetically — without friction, without wear.

As for performance, *this* control provides infinitely fine speed-load characteristics. It's the most responsive crane control yet devised.

Magnetorque is only *one* of the features which distinguish P&H Overhead Cranes as leaders in the field. You can always look to P&H for what's new and better in overhead cranes — soundly backed by the experience of America's oldest and largest producer.

*T.M. of Harnischfeger Corporation for Electro-Magnetic Type Brake.

COMPARE FOR YOURSELF. This new literature contains speed-load curves for all types of crane controls printed on transparent pages so that you can compare one with the other. It clearly explains Magnetorque, has other helpful information. Write for Bulletin C-30.

P&H OVERHEAD CRANE DIVISION
HARNISCHFEGER CORPORATION
MILWAUKEE 46, WISCONSIN

the P&H Line

Ceramic Cutting Tools

Made of aluminum oxide, these cutter tips look promising. One advantage—the base material is abundant

HIGH PURITY, high density aluminum oxide ceramics may become a ranking cutting tool material for tomorrow's machining jobs.

Scientists at the Rodman Process Laboratory of the Ordnance Corps' Watertown Arsenal report that ceramics with an aluminum oxide base have proved themselves in machining tests.

Pros—Researchers feel one of the king-sized advantages lies in the fact that the ceramic materials are readily available—can be substituted for strategic tungsten, cobalt, molybdenum, chromium and vanadium contained in most cutting tool materials.

TOOL HOLDERS
. . . rigidity is essential, standards can be used

Other advantages: High hardness, high temperature strength, good wear resistance. In short, the ceramics compare favorably with carbides on steel cutting jobs, particularly on light finishing cuts at high speeds.

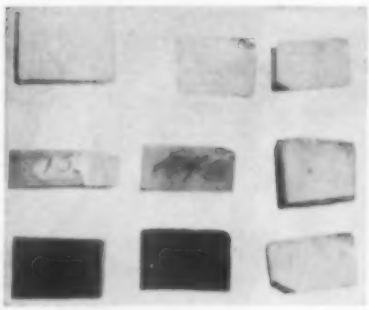
Cons — Tensile strength at low temperature, ductility and thermal shock resistance of the ceramics are usually inferior to carbide and high speed steel cutting tools.

Also, the reproducibility of ceramic material is a problem. In some cases, two pieces of the same ceramic gave different results in tests.

Tools — Tips are mechanically clamped to the holders (brazing is out since it produces no bond with the ceramic) and mechanical chip breakers are used. Back rake angle is 0 degrees. Side rake is 10 degrees, with a narrow land having a 7-degree negative rake. Side cutting edge angle is 10 degrees, end cutting edge—5 degrees.

So far, they've run 4140 steel, 300 Brinell, at speeds up to 1200 sfm and depths of cut up to ¼-in.

Test tools showed little or no cratering on the top face, although normal edge wear was evident at high speeds.



CERAMIC TIPS
. . . they're ground dry, edge is hand honed

1. **Increased Production.** Pope Spindles speed up output because they can take heavy cuts.
2. **Increased Wheel Life** because the shaft is rigidly supported by bearings of ample size.
3. **Super Precision Bearings** made to Pope specifications and used exclusively in Pope Spindles.
4. **Better Finished Ground Holes.** Pope precision craftsmanship assures work of the highest standard.
5. **Operating Time Saved.** One motor pulley serves all spindles except in unusual applications.
6. **No Additional Lubrication** is ever required. Thirty years of wide factory use has proven the ability of the Pope System of Sealed-in Lubrication to prolong bearing life, reduce maintenance costs and provide cool operation.
7. **Dynamic Balance.** Pope Spindles are dynamically balanced with all their rotating parts in full assembly to insure smooth running.

Pope Precision Internal Grinding Spindles come in the sizes, shaft extensions and speeds (up to 35,000 RPM) to meet your every need.

Ask for new catalog No. 57-A

No. 79

POPE
TRADE MARK REG. U.S. PAT. OFF.

POPE MACHINERY CORPORATION
ESTABLISHED 1920
261 RIVER STREET • HAVERHILL, MASSACHUSETTS
BUILDERS OF PRECISION SPINDLES

IS POINT BLUNT?

♦ P-K Type A Sheet Metal Screws have sharp gimlet points. Start easy, drive straight, even when holes in two sheets are misaligned.

$0.15
.015
. . . in assembly savings

the **POINT** makes the difference

A properly planned saving of 15 cents per unit can fade to 1½ cents — or nothing — on the assembly line . . . unless the screws you use have the good points that assure quick starting and straight driving.

Bad points are hard to detect in the package, but your cost sheets and customer complaints will soon show their effects — job slowdown, parts spoilage, hidden weakness.

That's why P-K quality standards have been set so high — to make sure you get P-K Self-tapping Screws that are not only *pointed for savings*, but headed, threaded, and heat-treated with one purpose, to keep your assembly lines trouble-free.

Start making *planned* assembly savings pay off . . . talk to a P-K Assembly Engineer. Parker-Kalon Division, General American Transportation Corporation, 200 Varick St., New York 14.

DOUBLE LEAD THREADS?

♦ P-K Type Z Self-tapping Screws have well defined taper. Screw stands erect in hole and double lead thread means quick, easy starting; forms secure mating threads.

PARKER-KALON

IN STOCK . . . see your nearby P-K Distributor . . .

HOW MANY FLUTES?

P-K Type F Screws have five thread cutting flutes; easier to start, less torque to drive, cut clean threads all the way in.

per unit

P-K STANDARDS
make sure you get
SCREWS POINTED FOR SAVINGS

P-K design and quality standards protect you against the bad points shown and many others that will slow down assembly and cause parts damage. They don't "get by" P-K Inspectors — that's why *all* P-K Self-tapping Screws can be "Guaranteed First Quality."

IS PILOT TOO SHORT?

Pilots of P-K Type U Drive Screws are proper size and length to permit screws to start straight, drive straight.

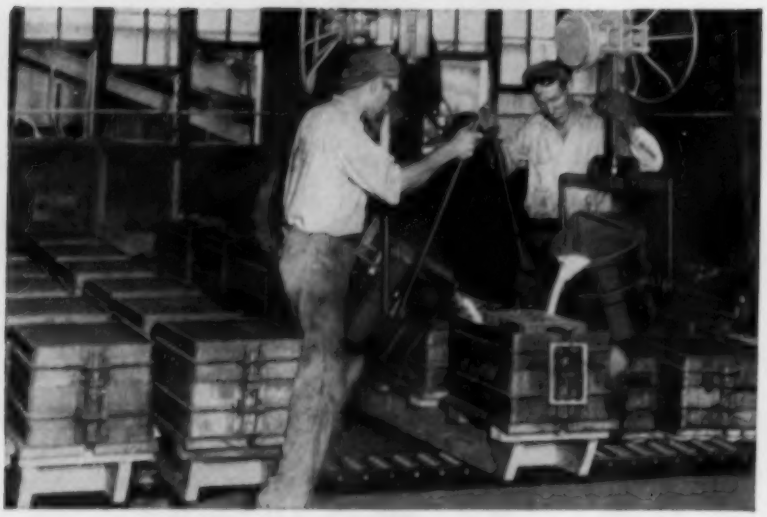
The First originated by P-K . . . and First today . . . the leading choice for fastening economy

SELF-TAPPING SCREWS

your local Supply and Service Specialist

STANDARD'S SHIELDED BEARINGS

Are Expressly Designed for Foundry Conveyor Service



Every Standard roller conveyor is equipped with specially designed bearings that provide the maximum of protection and durability in foundry service. Spillage of hot iron is guarded against by special steel shields. These convex shaped shields fit into the ends of rollers to repel foreign matter. An exit for small particles is provided by an opening at bottom of shield.

Foundry conveyors are designed and built in their entirety by Standard—in a wide range of sizes, weights and types. You can depend on Standard for the right conveyor for your needs — we have been designing and building foundry conveyors since 1906.

STANDARD CONVEYOR COMPANY
General Offices: N. St. Paul 9, Minn.
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Engineered Conveyor Systems • Portable Conveyor Units • Spiral Chutes • Pneumatic Tube Systems

Send for Standard's special catalog "Conveyors for Foundries" — a valuable reference book illustrating and describing conveyor installations in leading foundries.

Write Dept. ST-25

Standard
GRAVITY & POWER
CONVEYORS

ENGINEERED FOR LOW-COST PRODUCTION

Magnets Line Up Parts

Mounted in a piercing die, they eliminated rejects which ran 10 per cent daily

PERMANENT MAGNETS mounted on a piercing die completely eliminated rejects on one job for a manufacturer of warm air heating and air-conditioning registers.

Hart & Cooley Mfg. Co., Holland, Mich., found that in punching holes in register frame sections, scrap parts were running as high as 10 per cent daily. Operators weren't lining up the stock squarely with the die stops.

Function—The holes are for positioning the fins of the register in a subsequent operation and must line up in adjacent sections or the fins won't fit.

It was bad enough to produce scrap at the press, but the big damage came after man-hours were expended in welding sections of the register frames together and then finding the holes were out of line. This meant scrapping the whole assembly.

PIERCING DIE
. . . with aligning magnets

Solution—To overcome this situation, production engineers redesigned the die to hold two Carboloy Alnico 5 type horseshoe-shaped magnets with a rated pull of 25 lb. They were clamped in the die and incased in nonmagnetic fiber blocks so the magnet was insulated from the die except for the ends facing the die stop.

Now, the operator positions the steel frame against a stop at the left end of the die and the magnets snap the part tightly against the back die stop, in perfect alignment with the punches. An air-operated knockout ejects the pierced piece.

Further benefit of the magnets has been higher press production due to simplified alignment.

LOOKING FOR WAYS TO CUT SLAG HANDLING COSTS?

the answer is here!

JOHNSTON CORRUGATED CINDER POTS

...HAVE LONGER LIFE... *they outlive other pots... proved by records*

...PROVIDE FASTER TURN-AROUND TIME

...LOSE LESS TIME AT THE SLAG PIT *through easier, speedier, cleaner dumping.*

...REDUCE MAINTENANCE TO A MINIMUM... *base suspension of the pot eliminates distortion and breakage.*

These are the ways Johnston Cinder Pots can assure lower cost-per-ton slag handling. They are available for blast furnace, open hearth or electric furnace operations—in sizes to serve all slag handling operations

MACKINTOSH-HEMPHILL COMPANY

Makers of the rolls with the striped red wobblers

PITTSBURGH AND MIDLAND, PA.

MACKINTOSH-HEMPHILL PRODUCTS INCLUDE: all types of cast mill rolls . . . improved Johnston patented corrugated cinder pots and slag handling equipment . . . Mackintosh-Hemphill rotary straighteners . . . electronically controlled contouring lathes . . . screw feed roll turning lathes . . . heavy duty engine lathes . . . shears . . . end-thrust bearings . . . steel and special alloy castings . . . reversing hot strip mills . . . Y-type cold strip mills.

MAKE THIS TEST

Place Johnston Corrugated Cinder Pots side by side with other pots on your slag train. Give them the same treatment day by day. Be sure to keep a record of performance. It won't be long until you'll convince yourself that for lower costs you must join the *trend* to Johnston Corrugated Cinder Pots.

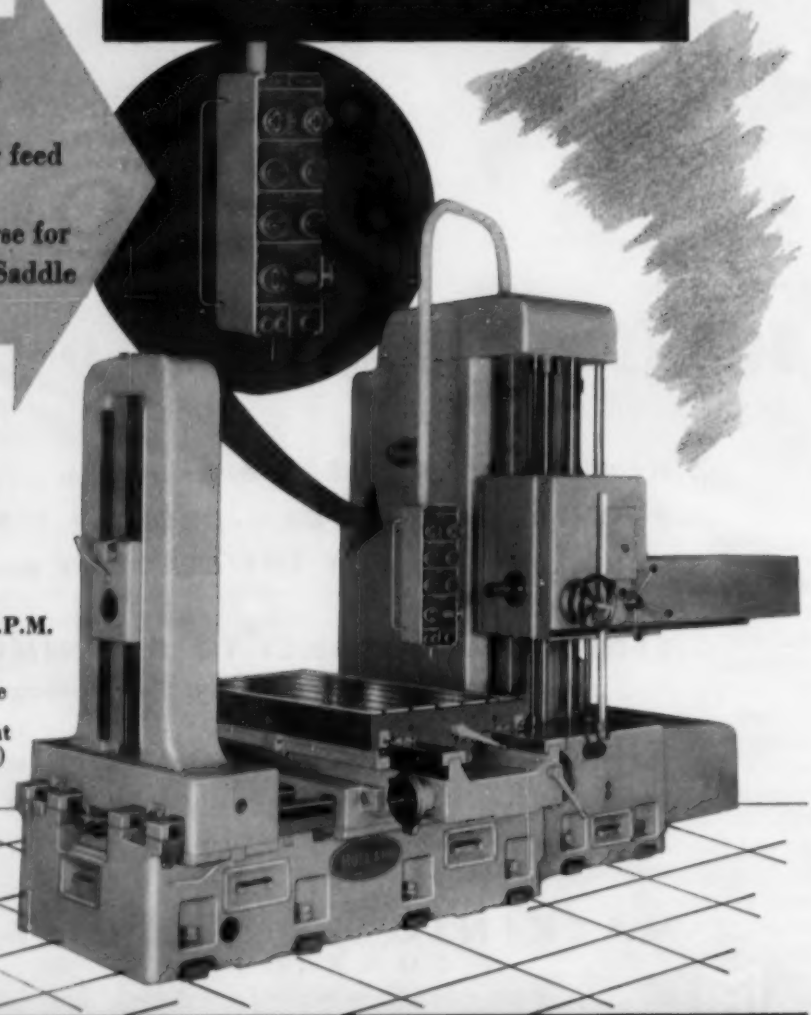
Write today for the bulletin describing and explaining all the features of Johnston Corrugated Cinder Pots.

NEWEST

SEVENTY FIFTH
1880 BULLARD 1955
ANNIVERSARY

3 11 HORIZONTAL BORING MILLING and DRILLING MACHINE

PENDANT CONTROL
Complete machine control from a movable station for feed and speed selections, directional feed and traverse for Spindle, Head, Table and Saddle



ADDITIONAL FEATURES

- Both Screw and Rack Feed to the spindle
- Massive 4-Way Bed, Head, Headpost and Rear Post for rigidity
- Spindle Speed up to 2000 R.P.M.
- Replaceable Ways, chrome hardened, on Bed and Saddle
- Optical measuring equipment for head and table (optional)

FOR FULL INFORMATION CALL YOUR NEAREST BULLARD SALES OFFICE OR DISTRIBUTOR OR WRITE . . .

THE BULLARD COMPANY | BRIDGEPORT 2, CONNECTICUT

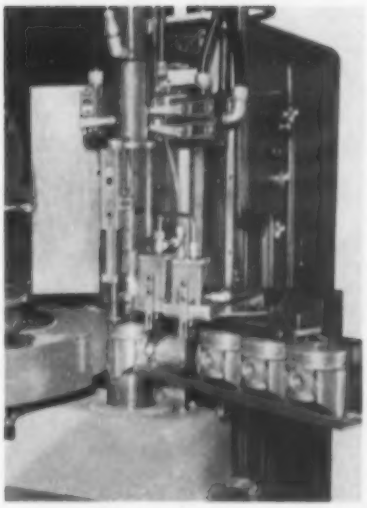
NEW PRODUCTS and equipment

Write directly to the company for more information

Precision Grinder Works Automotive Pistons

Aluminum pistons can be delivered to the machine by conveyor and transfer mechanism. An automatically timed loader places the piston in grinding position. Rotation begins as the grinding wheel advances rapidly to grinding position. The slow grinding feed then proceeds to a positive, predetermined size. After a timed sparkout period, the grinding wheel retracts rapidly to a back position and the piston is ejected to another conveyor. At the same time, another piston is loaded and the cycle repeats itself. Aluminum pistons are ground by the infeed method, using a wide wheel which reciprocates laterally during the grinding cycle. Pistons are elliptical (produced by using a master cam and rocking work cradle). Wheel dressing is automatic after a predetermined number of pistons are ground. The wheel head automatically advances the same amount as the size of the wheel is decreased by dressing.

The 5-in. type-H piston has Microsphere bearings for both the work head spindle and grinding wheel spindle. Lubrication to bearings is automatic. Pressure must be built up in the system before the motors can be started. Landis Tool Co., Waynesboro, Pa.

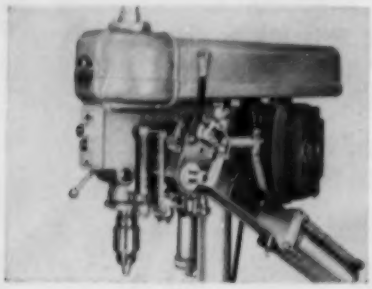


Grinder for Work on Small Tools and Cutters

The model No. 1 has cartridge-type grinder wheel spindle mounting with a double row of special preloaded antifriction bearings. They are packed in grease for lifetime lubrication. The cartridge-type unit may be replaced. A reversible, ½-hp motor drive, which is built into the wheelhead, provides any desired direction of grinding wheel rotation. Spindle speeds (6260 or 3730) are easily obtainable from a tooth-grip drive belt and sheave arrangement. Grinding wheels are easily interchanged. An antifriction table slide provides ease of movement. Curtain-type dust guards protect the table slide and table movement operating controls.

A 360 degree eccentric wheelhead swivel adds 3 in. to the conventional cross range of 4½-in. A setting device enables the operator to position the swivel table quickly with a high degree of accuracy. Cincinnati Milling Machine Co., Cincinnati 9, O.

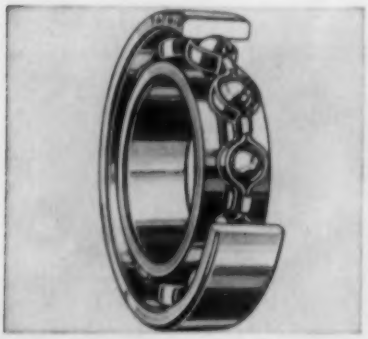
Air Feed for Drill Presses Has Newly Designed Pneumatic Microvalve



The microvalve imparts to the spindle the desired sensitive, automatic feed-and-retard action for a variety of continuous production operations for woodworking and metalworking. With a check valve and a series of set screw adjustments, the rate of feed is controlled to fit the job at hand. Release of a valve-stop reverts the air feed to single cycle operation. Removal of two plugs from the air cylinder head converts it for conventional hand operation. The manufacturer claims the accuracy of feed will hold indefinitely within 0.003 in.

Feed pressure at the drill point averages 14 times greater than air pressure. Air pressure can be regulated. Kearney & Trecker Corp., Walker-Turner Div., Plainfield, N. J.

Light Section, Large Bore Bearings



The M9300K Series is designed for applications where space and weight are at a premium. With their precisely balanced design, they are capable of handling light to moderate radial loads and moderate thrust loads in either direction. They are made to standard boundary dimensions of the American and International Standards Assoc.

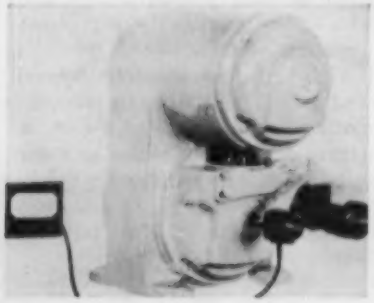
Typical applications for these special precision bearings are found in jet engine gear boxes, helicopter gear boxes, accessory drives and machine tools. Sizes, dimensions, load ratings and mounting data are available on request. Fafnir Bearing Co., New Britain, Conn.

Tool Holder for Medium-duty Machining Eliminates Carbide Grinding

The Multicut holder features throwaway carbide inserts and an adjustable carbide-tipped chip breaker clamp. The clamp is serrated in steps of 0.040 in. The range of adjustments is ⅛-in. on smaller inserts to 5/32 and 3/16-in. on larger inserts. Rapid one-adjustment insert indexing or changing is possible from either top or bottom of the holder since the locking screw contains hex sockets on both ends. Extreme front and side clearance angles and wide range of sizes make it ideal for turning, boring or facing operations in confined setups.

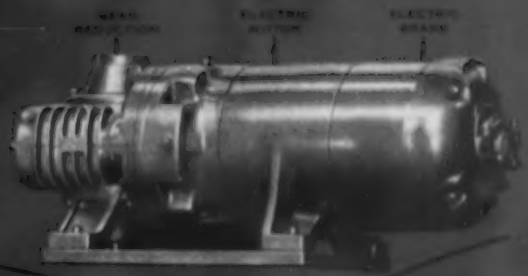
Replacement parts are interchangeable. The anvil locator is one piece. Wesson Co., 1220 Woodward Heights Blvd., Detroit 20, Mich.

Variable Speed Drive with Electric Speed Indicator



The Speed-Trol variable speed drive can be equipped with a direct pickup electric tachometer. The device includes a signal generator and speed indicator. Standard calibration of the indicator is in revolutions per minute. It can also be furnished calibrated in various units of production, such as feet per minute, gallons per hour, cubic feet per minute. Speed-Trols are available in ratings from ½ to 30 hp in standard, single, double or triple reduction drives.

Sterling also builds drip-proof and totally enclosed motors, Slo-Speed gear motors and Multi-Mount speed reducers. Sterling Electric Motors, Inc. 5401 Telegraph Rd., Los Angeles 22, Calif.

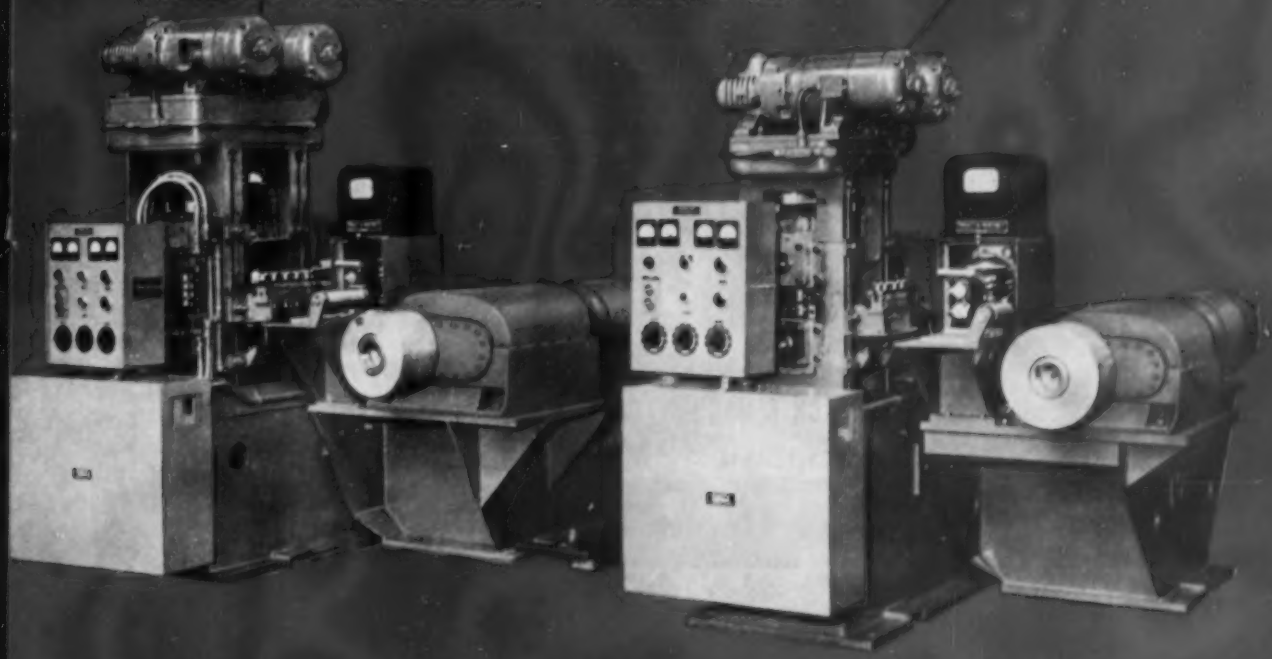


See how easily the standard electric motor, standard gear reduction, standard electric brake combine into a drive that gives the RIGHT horsepower, the RIGHT shaft speed, the RIGHT features . . . all in one compact unit. Nowhere else will you find power units that are so flexible, so easily adaptable, and in such a wide range of types and ratings.

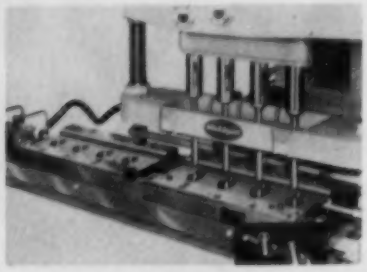
Master power drives are available in thousands and thousands of ratings (⅛ to 400 HP) . . . in open, enclosed, splash proof, fan cooled, explosion proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 430 to 1 ratio . . . with electric brakes . . . with fluid-drive . . . with mechanical or electronic variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best power drive for you.

standard units easily combine into special purpose drives

THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO



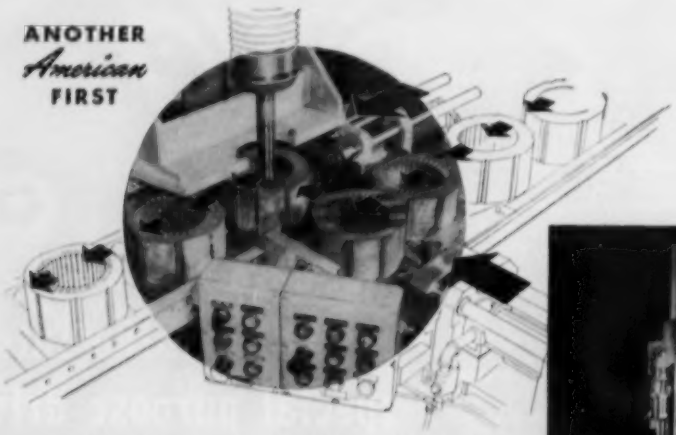
Shuttle Fixture Finish Reams 1200 Rocker Arms Per Hour



The 2-station automatic shuttle fixture is mounted on a Michigan standard Hydro 5. One station is loaded while processing takes place at the other station. It is built to JIC standards. Coolant is supplied to each spindle and all parts are lubricated automatically.

Interchangeable nesting plates, for any size or shape rocker arm, will fit this fixture. A pilot on the reamer picks up the part location prior to the actual sizing by the reamer. After the finish reaming, the rocker arms are ejected automatically, down a rear chute, into tote pans. This method is said to increase tool life, keep downtime to a minimum and reduce maintenance. The method eliminates the need for further super finishing. Michigan Drill Head Co., P. O. Box 4643, Detroit 34, Mich.

ANOTHER *American* FIRST



. . . COMPLETELY AUTOMATED BROACHING

STATOR PARTS BROACHED IN 20 SECONDS

Installed in a conveyor line, this American 3-way broaching machine with a hydraulic broach retriever and electrical controls, broaches the I.D. of stator parts in a 20 second cycle. Parts coming into the machine are automatically shuttled into position, broached, and then discharged back on the conveyor line. Interchangeable broach arbors and broach shells make it possible to broach several different parts of similar size.

FOR AUTOMATED OR INDIVIDUAL BROACHING PROBLEMS — SEE *American*

American approaches each broaching problem as part of the complete production cycle. Broaches, fixtures and machines — all designed and built by American — provide a complete broaching service. Let American help you cut your production costs. Send part print or sample to get the solution to your broaching problem. Ask for Catalog No. 450.

BEVEL GEAR BLANKS BROACHED IN 15 SECONDS

Using tooling similar to that illustrated, an American (PD) pull-down machine, installed in a conveyor line, automatically broaches the I.D. of a bevel gear blank in 15 seconds. By using interchangeable broach arbors and broach shells, over 20 similar bevel gear blanks are broached with this set-up.

American BROACH & MACHINE CO.
A DIVISION OF SUNDSTRAND MACHINE TOOL CO.
ANN ARBOR, MICHIGAN

See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery

Cast Iron Fans for Industrial Use

These fans have been redesigned to provide greater versatility and efficiency. The line handles wood shavings, chips, granular material, textile fibers, asbestos, rags, powders, dust, gases and fumes. For specific applications, any of four different wheels or three drive arrangements may be selected.

The redesigned 500 series of fans features a wide range of

sizes with wheel diameters ranging from 8¼ to 34½-in. and inlet pipe sizes from 4½ to 18 in. Air volumes range from 150 to 12,000 cfm. Fan housings are convertible to all normal discharge directions and are reversible. Large heavy-duty shafts with grease-lubricated double-row ball bearings take minimum maintenance. Bearings are triple sealed. Westinghouse Electric Corp., Sturtevant Div., Dept. 022, 200 Readville St., Hyde Park, Boston 36, Mass.

today—it's a bigger catch with MUSCLES OF STEEL

Five billion pounds of fish yearly. It's a catch that would make the oldtime Gloucester fisherman gasp—yet it's all in the day's work for America's modern fishing industry. And it's a job that couldn't be handled without the aid of *muscles of steel*—indispensable wire rope.

Whether off the Newfoundland Banks, along the Gulf Coast, or in the waters of the Pacific, powerful winch-equipped trawlers depend on Wickwire Rope to haul in their heavily laden nets.

On landlubber assignments, too, Wickwire Rope has a vital role in helping American industry do a better and more efficient job. In the oil fields and the logging camps. In the mines and the quarries. On construction and highway projects. In numerous and varied materials handling operations. On all of these jobs, Wickwire Rope consistently demonstrates its ability to deliver performance that is unrivalled for long-lasting economy and reliability.

***every* industry benefits from wire rope**

WICKWIRE ROPE

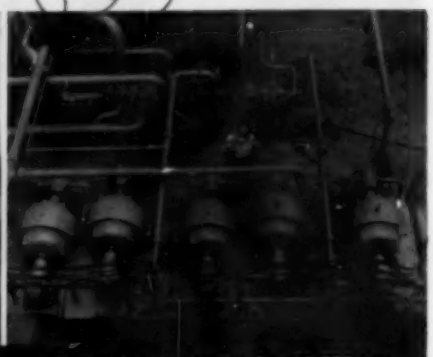
CFI PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

2534

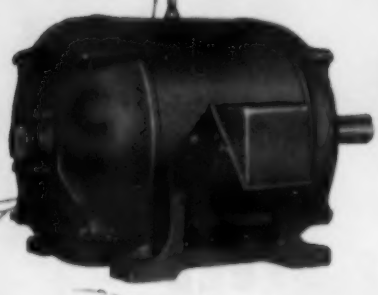
Mammoth press mashes auto into small bale . . .

Into the world's largest press goes a junk auto . . .

Two minutes later it emerges . . . *a bale measuring only 2x2x5 feet!*



Power for the tremendous 1,018-ton hydraulic pressure was produced by five 100 H.P. Century motors.



5 Century Performance-Rated® MOTORS provide the 1,018-ton "muscle"!

Century motors are Performance-Rated to fit all kinds of applications, including unusual ones like this. These 5 motors combine precisely the correct horsepower, speed, torque, frame protection and mounting for efficient operation of this huge press.

Whatever your motor needs, you can depend on Performance-Rated Century motors to develop *all* the performance that's built into your modern production equipment. And, because they are so carefully matched to the job, Century motors give maximum service life.

For Performance-Rated output, specify Century motors on your new equipment. For Performance-Rated replacement motors, call your nearby Century Authorized Distributor, or contact our branch office.

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CENTURY ELECTRIC COMPANY

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1/8 to 400 H.P.

1806 Pine Street — St. Louis 3, Missouri

Offices and Stock Points in Principal Cities

NEW Literature

Write directly to the company for a copy

Tube Burring

The In-Ex tube burring tool for use in internal and external burring is described. The tool will handle copper, brass, aluminum alloy or annealed steel tubing in sizes from 3/16 through 1½-in. OD—catalog file 1149A1, 1 page. Parker Appliance Co., Tube & Hose Fittings Div., 17325 Euclid Ave., Cleveland 12, O.

Grinders

This edition illustrates, in detail, the 10 and 14-in. plain hydraulic cylindrical grinding machines. Pressure lubricated Microsphere wheel spindle bearings are featured—catalog B-54, 19 pages. Landis Tool Co., Waynesboro, Pa.

Gages

The company's latest catalog on limit-type gages is now available—catalog LTG-54, 50 pages. Sheffield Corp., Dayton 1, O.

Iron Powder Electrodes

"Iron Powder Electrodes and Their Application" covers the theory of the new electrodes and explains why they have a basic advantage in higher deposition rates—8 pages. Lincoln Electric Co., 22801 St. Clair Ave., Cleveland 17, O.

Malleable Iron Castings

Here are data on malleable iron's machinability, its toughness and ability to withstand shock, metallurgical composition, yield and tensile strengths, corrosion resistance, advantages, manufacture and relative cost. Albion Malleable Iron Co., Albion, Mich.

Products Catalog

This general catalog features bulk bins, three lines of work benches and the recently developed machine and assembly stand that furnishes a number of bearing points for mounting bench tools or assembly fixtures—catalog 155, 20 pages. Sturdi-Bilt Steel Products Inc., 2501 W. Peterson Ave., Chicago 45, Ill.

Glass-Reinforced Plastics

Technical data on custom-molded parts of the Ace glass-reinforced plastics are given in this bulletin—GRP-1, 12 pages. American Hard Rubber Co., 93 Worth St., New York 13, N. Y.

Air Filters

The company's mechanical air filters are described. The history,

NILSON 4-SLIDE TAKES A TOUGH ONE . . .

Mass production of body trim clips for a leading make automobile proved a complex forming problem. A. H. Nilson's 4-Slide (Model S-4-T) did the job, forming .025" x 3", 1065 C.R.A. steel at 54 strokes per minute! Accurate, fast, and automatic, Nilson 4-Slides keep pace with one of the nation's biggest industries.

THIS ONE WAS EASY . . .

A Nilson 4-Slide, Number 1, forms 150 drapery hooks per minute from 0.70 basic steel wire. Nilson 4-Slides form wire or ribbon stock from the coll. They straighten, feed, pierce, blank, swage, stamp or coin, cut and form in one, fast, automatic operation . . . accommodate wire up to .5" dia., in feeds to 32" max., and ribbon up to 3.5" wide. Press sections from 5 to 75 tons.

A. H. Nilson provides forming recommendations from detailed information without obligation. Send for catalog.

A.H. NILSON MACHINE COMPANY

1512 RAILROAD AVENUE, BRIDGEPORT 8, CONNECTICUT

Automatic Chain Making Machines : Staple Forming Machines : Wire and Stock Reels : Wire Straightening Equipment : Slide Feeds for Presses

ERIE

In the good old days

WHEN GRANDPA RAN THE BIG FORGING HAMMER

The days of the old-fashioned "Meller-drammer"

Grandpa and all the rest of his crew rode to work on a bicycle built for two. We put in a 60 hour long week . . .

For 20 cents an hour wage, at peak . . .

And, our boss, when things were going fine . . .

For himself a 10 dollar check would sign!

Even then, Erie was THE GREATEST NAME IN FORGING HAMMERS

A 2000 lb. Erie Steam Hammer of about 1909

"IN OUR 60TH YEAR"
ERIE FOUNDRY CO.
ERIE, PA.

NEW LITERATURE

principle of operation, application, filter test methods, engineering data, description and suggested specifications are included—catalog M-10, 10 pages. Trion Inc., 1000 Island Ave., McKees Rocks, Pa.

Tools, Dies

A new booklet describes the company's facilities and methods for manufacturing precision equipment and machinery. You are taken on a picture tour of the plant. Brief descriptions of production methods accompany illustrations—31 pages. Heidrich Tool & Die Corp., 10400 Capital Ave., Oak Park, Mich.

Excavator Crane

This informative brochure describes the Hystaway Excavator Crane mounted on new or used Caterpillar D6, D7 or D8 track-type tractors—No. 1235, 20 pages. Hyster Co., 2902 N. E. Clackamas, Portland 8, Oreg.

Tool Grinder

Details on the No. 3 tangent-arc profile grinder are available—bulletin TPG-3, 4 pages. Union Twist Drill Co., Athol, Mass.

Aluminum

Descriptive material on metallurgy, casting practices and important specifications of aluminum casting alloys will be found in "Aluminum Casting Alloys Handbook"—60 pages. Federated Metals Div., American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.

Gears

Information and specifications on double helical gears are offered. Included are construction design, testing and applications—bulletin 1958E. Worthington Corp., Advertising & Sales Promotion Dept., Harrison, N. J.

Temperature Transmitter

The Nullmatic temperature transmitter (model 33) is described in detail. Schematic drawings and illustrations supplement the text—bulletin 3302, 8 pages. Moore Products Co., H & Lycoming Sts., Philadelphia 24, Pa.

Motors

Servo motors, motor tachometers, synchros, as well as a new line of special transformers for use with grid-controlled rectifiers, are listed—catalog 41, 36 pages. Servo-Tek Products Co. Inc., 1086 Goffle Rd., Hawthorne, N. J.

Industrial Tape

This catalog contains industrial tape samples together with their

IN TODAY'S forge shop

WHERE FASTER FORGING REQUIRES AN ALL-STEEL HAMMER

WHEN each hammergang's 'down time' is so costly if mechanical failure sets in,

WHEN competitive bidding in mass production requires every effort to be costed at minimum

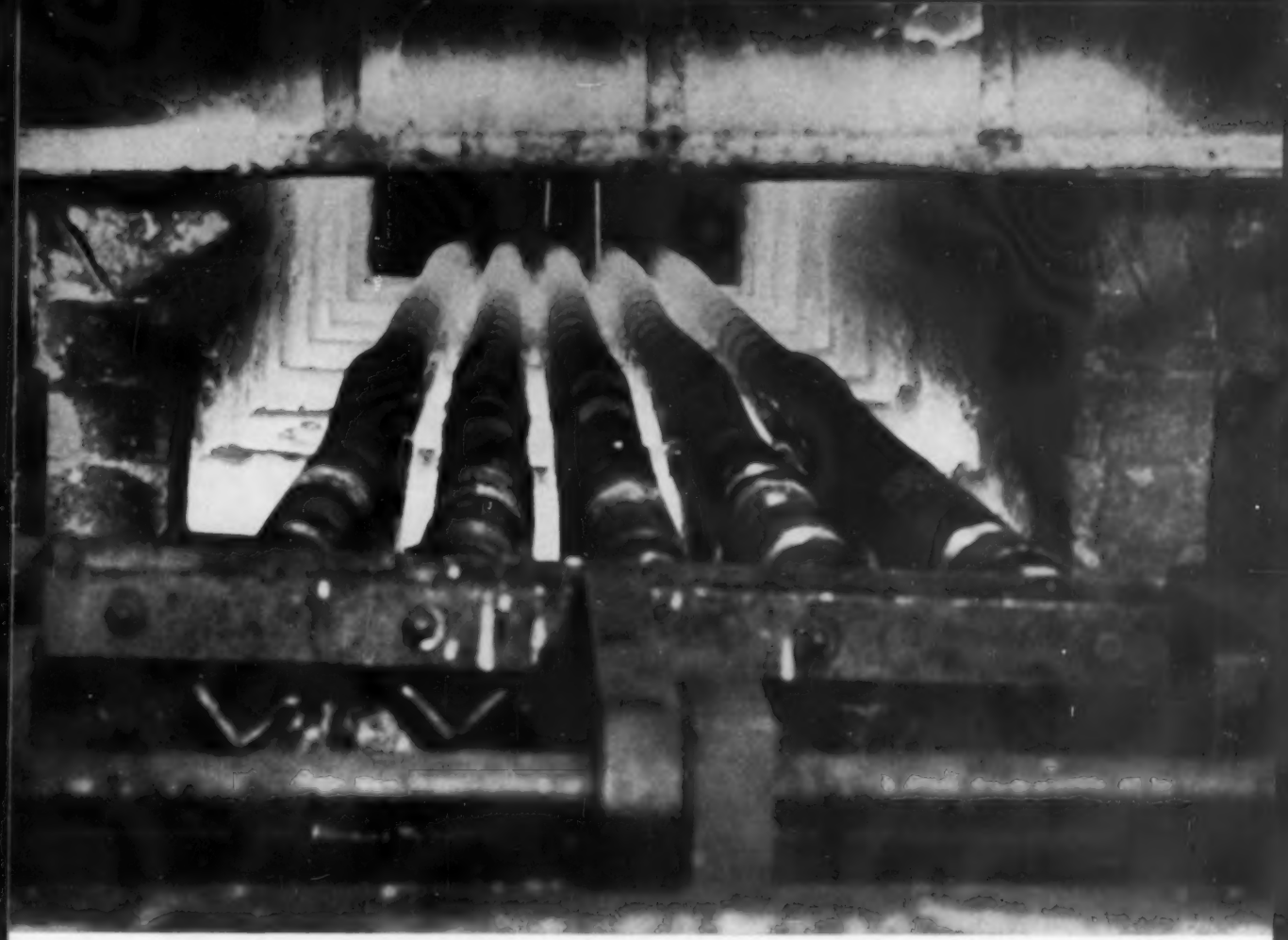
WHEN product perfection must be taken for granted as buyers specify less and less tolerance allowances

The tireless performance of the all-steel construction (in all stressed parts, upper works, frames, and anvils) makes

ERIE, MORE THAN EVER, THE GREATEST NAME IN FORGING HAMMERS

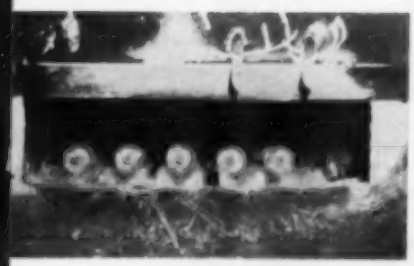
50,000 lb. Erie Steam Hammer — the largest ever built

"IN OUR 60TH YEAR"
ERIE FOUNDRY CO.
ERIE, PA.



Service that ruins stainless steel rails in 2 to 3 months leaves...

CARBOFRAX® SKIDS UNTOUCHED AFTER TWO YEARS



After two years, here's how the trough-shaped CARBOFRAX skids look—practically untouched by the thousands of steel blanks that have slid over them.

CARBOFRAX silicon carbide skid rails have already outlasted stainless steel rails 8 to 12 times in this pusher-type heating furnace...and are still in service! The side-fired gas-burning furnace is used by J. W. REX COMPANY, LANSDALE, PA., to heat 13-pound circular steel blanks to 1590°F at a rate of 115 blanks an hour.

The stainless steel skids the Rex Company used before failed regularly every two to three months, while frequent shutdowns to straighten or replace the rails ran up operating costs and curtailed output.

Silicon carbide's hot strength and resistance to wear at the operating temperature have completely eliminated these shutdowns...there hasn't been one since the CARBOFRAX rails were installed in May, 1952. And the heat conductivity of the trough-shaped CARBOFRAX skids assures that the blanks get uniform heating.

CARBOFRAX skids don't just outlast other skids. *Their first cost is usually lower than that of either water-cooled pipe or of those made of special heat-resisting alloys.* Why not get full information about CARBOFRAX skids right now, before your present ones wear out? Address Department W25, Refractories Division, The Carborundum Company, Perth Amboy, N. J.

CARBORUNDUM

Registered Trade Mark

. . . offers these advanced special-purpose super refractories: silicon carbide • fused aluminum oxide • electric furnace mullite • stabilized zirconia • boron nitride • boron carbide • zirconium boride • titanium boride • chromium boride • molybdenum boride • nickel aluminide

JOHNSON Graphited BEARINGS FOR MANY SPECIAL USES
JOHNSON GRAPHITED CAST BRONZE SLEEVE BEARINGS were developed primarily for applications where lubrication is difficult or likely to be neglected. Another important use is where the shaft speed is too slow or the temperature too low to sustain an oil film; also where high operating temperatures may burn out oils and greases. They are recommended where lubricants might damage goods or foods in process, where dripping oil cannot be tolerated, and in certain underwater applications. Johnson Graphited Bearings are available in three types: with serrated grooves, with graphite plugs, and with graphite-filled oil grooves. The serrated type is a stock item in over 200 sizes, available through Johnson Distributors. Write for full information.
JOHNSON BRONZE COMPANY, 550 South Mill Street, New Castle, Pa.
JOHNSON JB BEARINGS
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OTHER JOHNSON BEARING TYPES: General Purpose (GP) • Electric Motor (EM) • Self-lubricating Powder Metalluray • Universal Bronze Bars • Babbitt
SLEEVE BEARING HEADQUARTERS SINCE 1900

NEW LITERATURE

descriptions. The six basic types of tapes (bundling, tube sealing, thread protection, aperture sealing, protection, holding) are explained. Polyken Products, department, Kendall Co., 222 W. Adams St., Chicago 6, Ill.

Curtain Wall

The new techniques and improved equipment being used to field assemble insulated metal curtains and sandwich walls at substantial savings are described in "The Curtain Wall Story"—14 pages. Nelson Stud Welding Div., Gregory Industries Inc., Lorain, O.

Gear Cutters, Hobbers

Automatic spur gear cutters and gear hobbers are detailed—bulletins 157, 156; 7 and 6 pages. Potter & Johnston Co., subsidiary, Pratt & Whitney, division, Niles-Bement-Pond Co., Newport Ave., Pawtucket, R. I.

EDITORIAL REPRINTS:

Write Readers' Service, STEEL, Penton Bldg., Cleveland 13, O.

Employees on Your Side

Some 8000 companies now have profit-sharing plans. Proponents say they help lower costs and boost employee morale. To learn more about them, see p. 58.

Blast Furnace

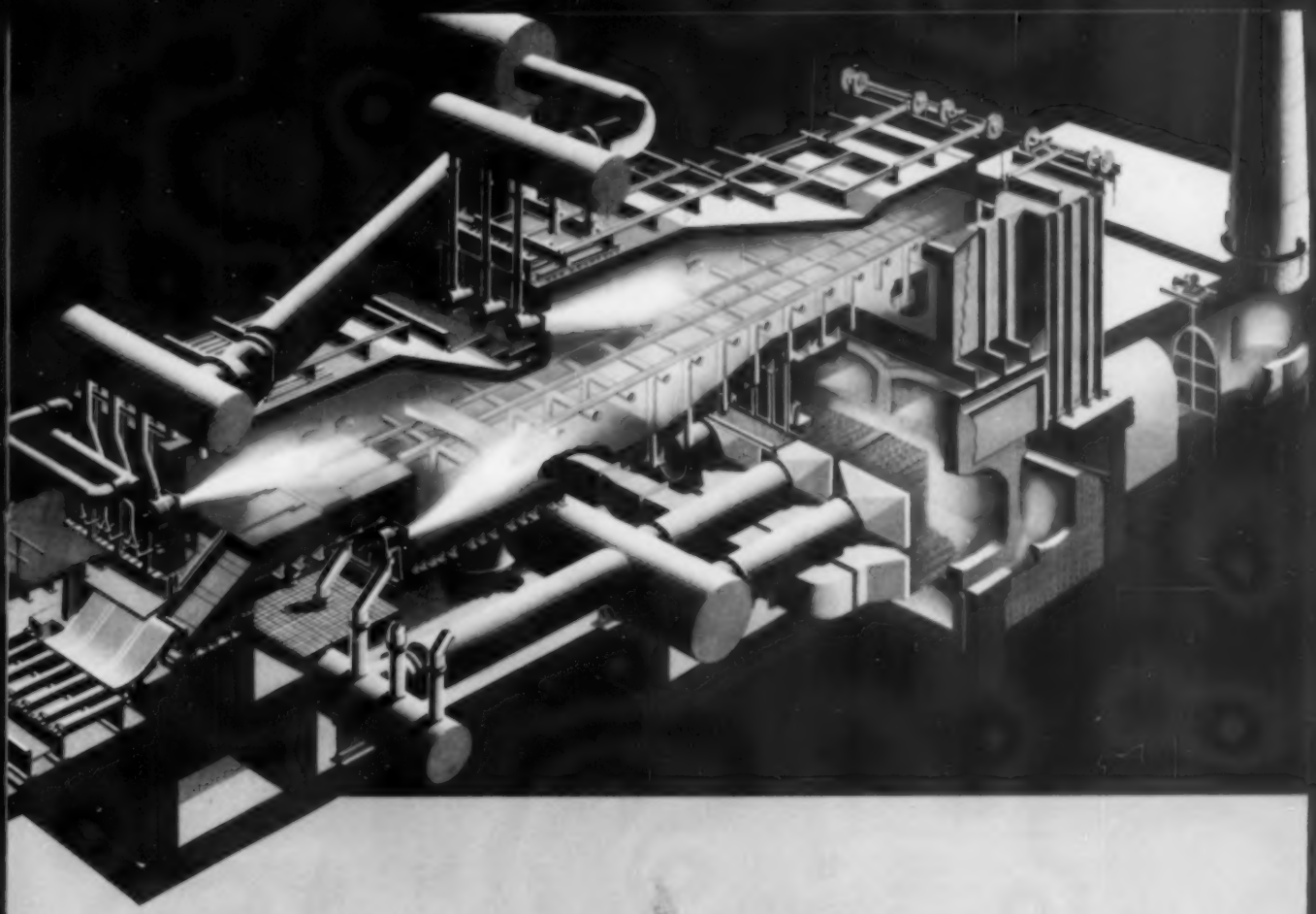
Part IV calls attention to the fact that it will take more than the improvement of the individual components of the burden to up furnace output. Distribution and gas permeability will need attention, too, p. 96.

Metalworking Goes South

Metalworking employment in eight southeastern states has jumped 100 per cent since 1949. For the whys and wherefores of the trek, see p. 65.

Turbines and Tomorrow

Generating and distributing capacity of electric power must be doubled by 1965. They've made larger turbines for operation at their higher steam conditions. For a long time, this led to increased efficiency. Since the gain has just about leveled off, engineers must look to higher temperatures and pressures for further gains in efficiency, p. 88.



Prime example of Salem-Brosius' furnace-engineering ability

The huge industrial furnace illustrated here attests to the superior engineering skill of Salem-Brosius. One of a few of its kind in the country, it is a pusher-type, triple-fired slab heater currently feeding the giant hot strip and sheet mills of a great steel producer. It features high capacity heating and soaking zones, heavy construction, recuperators for fuel economy, dual gas-oil fuel system, and many other advantages to assure positive, automatic control of furnace output and heating quality. *And the efficiency, economy, ease-of-operation, and trouble-free service this furnace represents are typical of all the furnaces Salem-Brosius builds.* Whether you require conventional heating or heat treating furnaces or furnaces to do an extraordinary job, Salem-Brosius offers equipment designed, engineered, and built not merely as a furnace but as a heating machine. You can purchase these furnaces as complete installations—equipped with all controls, piping and wiring—ready to operate.

Salem-Brosius products—furnaces, forging manipulators, goggle valves, slag granulators, clay guns, charging machines, grab buckets, and special equipment—are engineered for peak performance at lowest cost, because we believe that satisfied customers are our best advertisements. Before you invest in any of these products, we suggest it will pay you to call in a Salem-Brosius engineer and let him study your problem and present a proposal.

SALEM-BROSIUS, INC.

2400 EAST CARSON STREET, PITTSBURGH 3, PENNSYLVANIA

IN CANADA: SALEM ENGINEERING LTD. · 1525 BLOOR STREET WEST, TORONTO 9, ONTARIO

Some of the thousands of varied parts formed on the Steelweld Press. These involve bends and curves of every description in many plate thicknesses. Bars of heavy cross-section, usually requiring a bulldozer, are formed into semi-circles for gear rims and similar uses.

800 Tons of Plate Formed Monthly

STEELWELD PRESS
Produces
Infinite Variety of Curves and Bends

This Steelweld Press is rated at ½"x14'-0" mild steel. With the 24-inch bed and ram extension at each end, it will bend plate that can clear by the 18-inch deep throat to 18'-6" long. Two cross shafts with foot pedals are provided for operating the press. The lower shaft is for normal operation while the upper shaft brings the reversing flywheel into action to back the ram off the work whenever desired.

EVERY month some 800 tons of plate of all thicknesses to one-half inch is formed with bends and curves of every description on a Steelweld Press. The machine is in operation nine hours a day.

Since parts formed are produced in very small duplicate quantities, the dies and machine settings usually must be changed many times during a day. Because of the ease with which Steelweld Presses can be set up, the operators can do this quickly and easily.

Steelweld Presses offer so many advantages that we urge you to write for the catalog below and get all the facts on them. Hundreds of these machines are now in use for bending, forming and punching operations of every description.

GET THIS BOOK!
CATALOG No. 2010 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.
7851 East 281st Street, Wickliffe, Ohio

STEELWELD
BENDING PRESSES
BRAKING • FORMING • BLANKING • DRAWING • CORRUGATING • PUNCHING

STEEL
February 28, 1955

Market Outlook

THE AUTO INDUSTRY is being overrated as a key to this year's steel demand and supply.

Many people are wondering what will happen to steel production if the automotive industry has a strike or if auto production exceeds sales. You get the impression that autos alone govern steel production.

THE OTHER SIDE— The auto industry is important. It is the largest consumer of steel. But 80 per cent of the country's steel goes to industries other than automotive. And many of them are experiencing a pickup in business or have good reason to believe things will be better.

PROOF THAT COUNTS—Already, the demand for the forms of steel used outside the automotive industry is rising. Plates, for instance, are picking up as line pipe fabrication accelerates. Another company responding to the upturn in line pipe demand is Republic Steel Corp. It reopened its Gadsden, Ala., mill that makes large diameter pipe. Structural steel is feeling a pickup, too. You can see that from the price increase Phoenix Iron & Steel Co., Phoenixville, Pa., made on wide flange beams. It's now up to the industry level.

BRIGHT OUTLOOK— The upturn in demand for plates and structurals is important. It means a busy construction and maintenance industry—second largest user of steel. That industry has hopes of keeping busy for a long time. Needs are a long way from being satisfied. Road building continues to be a "must." If the federal government's $100-billion highway program becomes a reality, it will take more than $4 billion worth of structural steel, more than $2 billion worth of reinforcing steel and $1 million worth of culvert pipe, says David C. Roscoe, assistant general manager of sales, Bethlehem Steel Co.

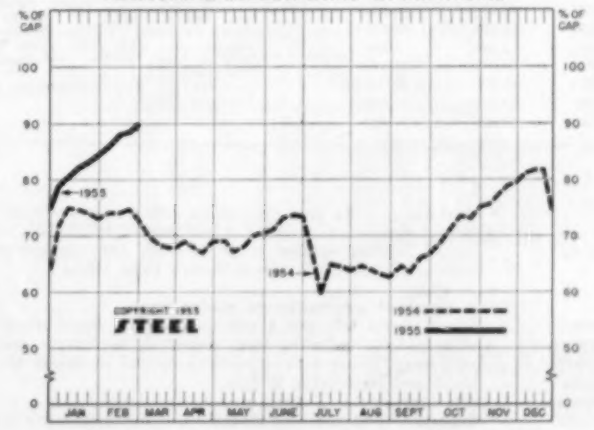
Another stimulant to the construction industry is the need for school buildings. This school year we're short 370,000 classrooms, the U. S. Department of Health, Education and Welfare says.

TANGIBLES—Some, but not all, of this construction is in the future. General Electric Co. is to spend about $165 million in 1955 for modernization and expansion of laboratories, plant and equipment. Other expansion and new facility programs of industry for this year include: Chrysler Corp., $20 million; National Cash Register Co., $16 million; General Motors Corp., $500 million; Standard Oil Co. of New Jersey, $785 million; and American Telephone & Telegraph Co., $800 million.

PROMISING—Later this year there even may be a slight upturn in expenditures for new plant and equipment, says A. W. Zelomek, economist, International Statistical Bureau Inc. Right now, plant and equipment expenditures are down. They were planned last year when business was lagging. Now, with business strengthened, plans for future expenditures will be expanded, Mr. Zelomek believes. These increased expenditures will begin to be felt later this year, he thinks.

STILL RISING—Right now, steel demand is so good that the nation's mills averaged 90 per cent of capacity in their production of steel for ingots and castings in the week ended Feb. 27. This rate, 1.5 points above the preceding week, is the highest of this year. Yield was 2,172,000 net tons, greatest since October, 1953.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended Feb. 27	Change	Same Week 1954	Same Week 1953
Pittsburgh	90	+ 1.5*	83	106
Chicago	92	+ 0.5	83	103
Mid-Atlantic	87	+ 1	72	95
Youngstown	92	+ 2	74	106
Wheeling	94	0	68	101
Cleveland	90	— 2.5	73.5	103
Buffalo	100	0	68.5	106.5
Birmingham	86.5	+ 1	80	98
New England	90	+ 2	58	89
Cincinnati	86.5	— 1.5	71	95.5
St. Louis	102	— 0.5	43.5	94
Detroit	88	0	72	104.5
Western	90	+ 2	80.5	109
National Rate	90	+ 1.5	72.5	100.5

INGOT PRODUCTION‡

	Week Ended Feb. 27	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	134.0†	133.8	127.7	109.3
NET TONS (In thousands)	2,153†	2,150	2,051	1,756

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,278 in 1955; 2,384,549 in 1954; 2,254,459 in 1953.

Metalworking Outlook—p. 49 Technical Outlook—p. 87

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Feb. 22 1955	Feb. 15 1956	Month Ago	Feb. Average
(1947-1949=100)	144.7	144.7	144.7	144.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Feb. 22

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.525
Rails, light, 40 lb	5.917
Tie Plates	5.275
Axles, railway	7.500
Wheels, freight car, 33 in. (per wheel)	49.500
Plates, carbon	4.675
Structural Shapes	4.617
Bars, tool steel, carbon (lb)	0.430
Bars, tool steel, alloy, oil hardening die (lb)	0.525
Bars, tool steel, H.R., alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.860 (lb)	1.115
Bars, tool steel, H.R., alloy, high speed W 18, Cr 4, V 1 (lb)	1.610
Bars, H.R., alloy	5.575
Bars, H.R., stainless, 302 (lb)	0.422
Bars, H.R., carbon	5.000
Bars, reinforcing	4.963
Bars, C.F., carbon	5.160
Bars, C.F., alloy	11.375
Bars, C.F., Stainless, 302 (lb)	0.433
Sheets, H.R., carbon	4.870
Sheets, C.R., carbon	5.864
Sheets, galvanized	7.220
Sheets, C.R., stainless, 302 (lb)	0.553
Sheets, electrical	$9.350
Strip, C.R., carbon	7.493
Strip, C.R., stainless, 430 (lb)	0.415
Strip, H.R., carbon	5.112
Pipe, black, buttweld (100 ft)	15.000
Pipe, galv. buttweld (100 ft)	18.606
Pipe, line (100 ft)	146.504
Casing, oil well, carbon (100 ft)	154.218
Casing, oil well, alloy (100 ft)	227.875
Tubes, boiler (100 ft)	‡
Tubing, mechanical, carbon	‡
Tubing, mechanical, stainless, 304 (100 ft)	161.199
Tin plate, hot-dipped, 1.25 lb	8.533
Tin plate, electrolytic, 0.25 lb	7.233
Black plate, can making quality	6.233
Wire, drawn, carbon	7.938
Wire, drawn, stainless, 430 (lb)	0.546
Bale ties (bundle)	5.860
Nails, wire, 8d common	7.515
Wire, barbed (80-rod spool)	7.097
Woven wire fence (20-rod roll)	16.815

‡ Not available

STEEL's FINISHED STEEL PRICE INDEX*

	Feb. 23 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	194.53	194.53	194.53	189.74	156.13
Index in cents per lb	5.270	5.270	5.270	5.140	4.230

STEEL'S ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$117.82	$117.82	$117.82	$113.91	$93.18
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	56.54	46.47
Basic Pig Iron, GT	56.04	56.04	56.04	56.04	45.97
Malleable Pig Iron, GT	57.27	57.27	57.27	57.27	47.27
Steelmaking Scrap, GT	36.67	36.17	35.25	35.50	27.67

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 84; of arithmetical price composite, STEEL, Sept. 1, 1953, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Feb. 23 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.38	4.30	4.30	4.15	3.45
Bars, H.R., Chicago	4.30	4.30	4.30	4.15	3.45
Bars, H.R., deld. Philadelphia	4.55	4.55	4.55	5.302	3.93
Bars, C.F., Pittsburgh	5.40	5.40	5.40	5.20	4.10-4.15
Shapes, Std., Pittsburgh	4.25	4.25	4.25	4.10	3.40
Shapes, Std., Chicago	4.25	4.25	4.25	4.10	3.40
Shapes, deld. Philadelphia	4.53	4.53	4.53	4.38	3.42
Plates, Pittsburgh	4.225	4.225	4.225	4.10	3.50
Plates, Chicago	4.225	4.225	4.225	4.10	3.50
Plates, Coatesville, Pa.	4.225	4.225	4.225	4.10	3.60
Plates, Sparrows Point, Md.	4.225	4.225	4.225	4.10	3.50
Plates, Claymont, Del.	4.225	4.225	4.225	4.10	3.60
Sheets, H.R., Pittsburgh	4.05	4.05	4.05	3.925	3.35
Sheets, H.R., Chicago	4.05	4.05	4.05	3.925	3.35
Sheets, C.R., Pittsburgh	4.95	4.95	4.95	4.775	4.10
Sheets, C.R., Chicago	4.95	4.95	4.95	4.775	4.10
Sheets, C.R., Detroit	5.10	5.10	5.10	4.975	4.30
Sheets, Galv., Pittsburgh	5.45	5.45	5.45	5.275	4.40
Strip, H.R., Pitts.	4.05	4.05	4.05	4.425	3.25
Strip, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Strip, C.R., Pittsburgh	5.75	5.75	5.75	5.45	4.15
Strip, C.R., Chicago	5.85	5.85	5.85	5.70	4.30
Strip, C.R., Detroit	5.90	5.90	5.90	5.45-6.05	4.25-.40
Wire, Basic, Pitts.	5.75	5.75	5.75	5.525	4.50
Nails, Wire, Pittsburgh	6.85	6.85	6.85	6.85	5.20
Tin plate (1.50 lb), box, Pitts.	$9.05	$9.05	$9.05	$8.95	$7.50
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$78.00	$78.00	$78.00	$75.50	$63.00
Wire rods, ½-⅝" Pitts.	4.675	4.675	4.675	4.525	3.85
PIG IRON, Gross Ton					
Bessemer, Pitts.	$57.00	$57.00	$57.00	$57.00	$47.00
Basic, Valley	56.00	56.00	56.00	56.00	46.00
Basic, deld. Phila.	59.66	59.66	59.66	59.66	49.44
No. 2 Fdry, Pitts.	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Valley	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, deld. Phila.	55.16	55.16	55.16	60.16	49.94
No. 2 Fdry, Birm.	52.88	52.88	52.88	53.88	42.38
No. 2 Fdry (Birm.) deld. Cin.	60.58	60.58	60.58	60.43	49.08
Malleable, Valley	56.50	56.50	56.50	56.50	46.50
Malleable, Chicago	56.50	56.50	56.50	56.50	46.50
Ferromanganese, Duquesne	190.00†	190.00†	190.00†	200.00†	175.00*

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$36.50	$36.50	$35.75	$27.50	$32.00
No. 1 Heavy Melt, E. Pa.	39.50	38.00	36.00	24.00	23.50
No. 1 Heavy Melt, Chicago	34.00	34.00	34.00	25.00	27.50
No. 1 Heavy Melt, Valley	37.50	36.50	36.50	24.50	31.25
No. 1 Heavy Melt, Cleve.	34.00	34.00	33.50	21.50	28.25
No. 1 Heavy Melt, Buffalo	32.50	32.00	30.50	25.00	28.25
Rails, Rerolling, Chicago	49.50	49.50	49.50	36.50	40.50
No. 1 Cast, Chicago	40.00	40.00	40.00	29.50	41.00
COKE, Net Ton					
Beehive, Furn, Connisvl.	$13.75	$13.75	$13.75	$14.75	$13.25
Beehive, Fdry, Connisvl.	16.75	16.75	16.75	16.75	15.50
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	21.00

Daily Nonferrous Price Record

	Price Feb. 23	Last Change	Previous Price	Jan Avg	Dec. Avg.	Feb. 1954 Avg.
Copper	33.00	Jan. 26, 1955	30.00	30.180	30.000	29.750
Lead	14.80	Oct. 4, 1954	14.55	14.500	14.500	12.610
Zinc	11.50	Sept. 3, 1954	11.00	11.500	11.500	9.360
Tin	91.25	Feb. 23, 1955	90.625	87.280	88.649	85.181
Nickel	84.50	Nov. 24, 1954	80.00	84.500	84.500	80.000
Aluminum	23.20	Jan. 13, 1955	22.20	22.900	23.200	21.500
Magnesium	27.00	Mar. 9, 1953	24.50	27.000	27.000	27.000

Quotations in cents per pound based on: Copper, deld. Conn. Valley; Lead, common grade, deld. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, deld. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99+%, deld.; Magnesium 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.

- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.

- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.

- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.

- **Reports on iron and steel production, and materials and product shipments.**

FAMOUS FIRSTS IN THE IRON & STEEL INDUSTRY

There was a span of 22 years between the time the first American blast furnace was completed, until the time the first ton of iron was commercially produced.

In 1620 John Berkeley and a group of followers left England to build the first ironworks in America at Falling Creek, Virginia. As Berkeley and his crew cleared the land, erected houses and began constructing the furnace, the ever-present, suspicious Indians watched in the background.

Just as the blast furnace was to begin operation on March 22, 1622, the Indians attacked the ironworks and surrounding settlement. During the ensuing massacre the Indians killed all but one of the 384 colonists, and completely destroyed the furnace.

It was not until 22 years later, in Massachusetts, that the first successful American ironworks began producing iron.

Fortunately, the beginning of BAKER'S MAGDOLITE, the original dead-burned dolomite was more successful, because BAKER'S MAGDOLITE—then as now—offered producers lower refractory costs, increased furnace efficiency and more uniform ingots. It's MAGDOLITE's superior, properly burned, grain-sized particles that make the difference. BAKER'S MAGDOLITE is always 5 ways better: Composition, Preparation, Strength, Economy and Quality. The next time you order dead-burned dolomite, specify BAKER'S MAGDOLITE.

1-55

ANOTHER FAMOUS FIRST

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The original dead-burned dolomite

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Nonferrous Metals

Lead and zinc industry summaries for 1954 show how closely the two metals are statistically allied. Production, consumption, imports and prices show amazing similarities

Nonferrous Metal Prices, Pages, 138 & 139

EVEN for two metals as closely associated as lead and zinc the reports issued last week by the U. S. Bureau of Mines summarizing the two industries for 1954 are amazingly similar. Change a minor word here and there and make allowance for actual production figures and one report could almost be substituted for the other.

The big reason, of course, is that both metals come from pretty much the same sources. Also, the United States is not self-sufficient in these two metals, depending on large imports to supplement domestic supplies. On the other hand, they are both overproducing current demand and depending on the government to take excesses into stockpile to keep the industries producing at economical levels.

Instability — The accompanying chart shows the instability of mine production of lead during 1954. A similar chart could be presented for zinc mine production, and its peaks and valleys would coincide with those shown, although on a different level. Both operations hit their highest peaks in March and their lowest valleys in September or October, with a leveling off during November and December. Mine production of both metals was the lowest since 1933-34.

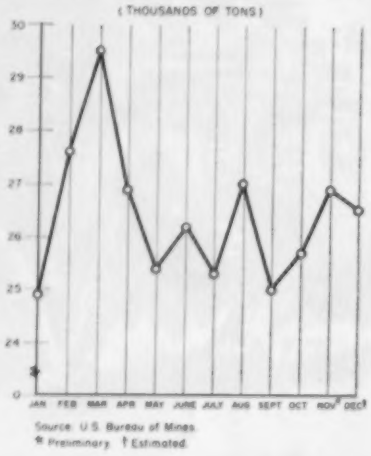
Consumption of both metals was off in 1954 from 1953 by nearly the same percentage, according to preliminary figures—9 per cent for lead and 11 per cent for zinc. Consumers' stocks were up for both. Producers' stocks showed some variation from the pattern, going down for zinc but rising for lead. Government stockpiling accounted for the better position of zinc stocks, but such figures were excluded from the consumption tabulation for lead.

Price Pattern—Prices for both increased over the year, taking a big dip in late January and February and recovering slowly until they reached the present levels in early fall. Imports of lead decreased 20 per cent while zinc imports dropped off 13 per cent. Exports constituted a minor part of the year's business, increasing slightly for zinc and decreasing a little for lead.

Both statements describe the depressed state last year "not so much a result of operation curtailments made in 1954 as an outgrowth of such curtailments initiated in 1952 and 1953 as zinc and lead prices declined."

Magic—What the reports do not show is that both lead and zinc, as if connected by an invisible bond, have made substantial recoveries in the first two months of this year. Demand is on the increase to the extent that both offered the government less metal this month than it was prepared to take into stockpile.

Lead Mine Production: Peaks and Valleys of 1954



Source: U.S. Bureau of Mines
*Preliminary †Estimated

Nonferrous Castings Improve

The nonferrous castings industry in December should have given a clue to the better times which were coming for zinc and lead in the new year. Bureau of the Census figures show that even then castings were on the upgrade. For zinc and zinc-base alloys the increase was from 48,437,000 lb in November to 50,177,000 lb in December. Lead and lead-base alloys went from 1,355,000 to 1,563,000 lb in the same period. The biggest jump came in aluminum and aluminum-base alloys, which were 62,752,000 lb in December, compared with 55,224,000 lb the preceding month. Total nonferrous castings increased from 177,197,000 to 189,200,000 lb in that period. The hot pace in the automotive industry is largely responsible for the improvement.

Copper Still Anybody's Guess

The copper situation is still far from settled. The London market has shown only fleeting signs of breaking on price. It drops a cent or two, then recovers all or most of it. And with Great Britain's tightest squeeze for copper still to come—probably in March or early April — quotations might jump all over the exchange before settling down perhaps in May.

Meanwhile, domestic producers stand steadfast on their 33-cent price, despite reported pressure from Chile to hike it to at least 36 cents. Little extra metal from south of the equator has been heading this way, and even a hike in U. S. price would not be any immediate help. Chile is reportedly sold out until July. So pressure goes on in this country for Uncle Sam to bail fabricators out of a tight spot, but it doesn't look like those efforts will shake loose much copper, if any at all.

Actually, it's the immediate situation that has most persons worried. There is no outright scarcity of the red metal. But unless a manufacturer has well established supply lines, he might have trouble scrounging up enough copper to meet his production schedules. In the long run, there should be enough metal so that by the end of the year producers will look back on January and February as just another bad dream.

Aluminum Never Had It Better

Over in the aluminum industry, they've probably never had it "so good." As predicted in this column last week, primary aluminum production set a new high mark, bettering December's 254,069,331 lb by over 2 million lb. The day after the Aluminum Association announced the record, the Aluminum Co. of America announced it would spend more than $35 million to increase the capacity of its works at Rockdale and Point Comfort, Tex., by 65,000 tons annually. The new capacity will be ready by the second quarter, 1956. The next day, Kaiser Aluminum & Chemical Corp. announced its earnings for three months ending Feb. 28. They will be slightly higher than the $6.4 million on sales of $65.2 million during the previous quarter. With announcements like this, it is little wonder that more and more copper and brass mills are turning profit-conscious eyes toward aluminum (see p. 55).

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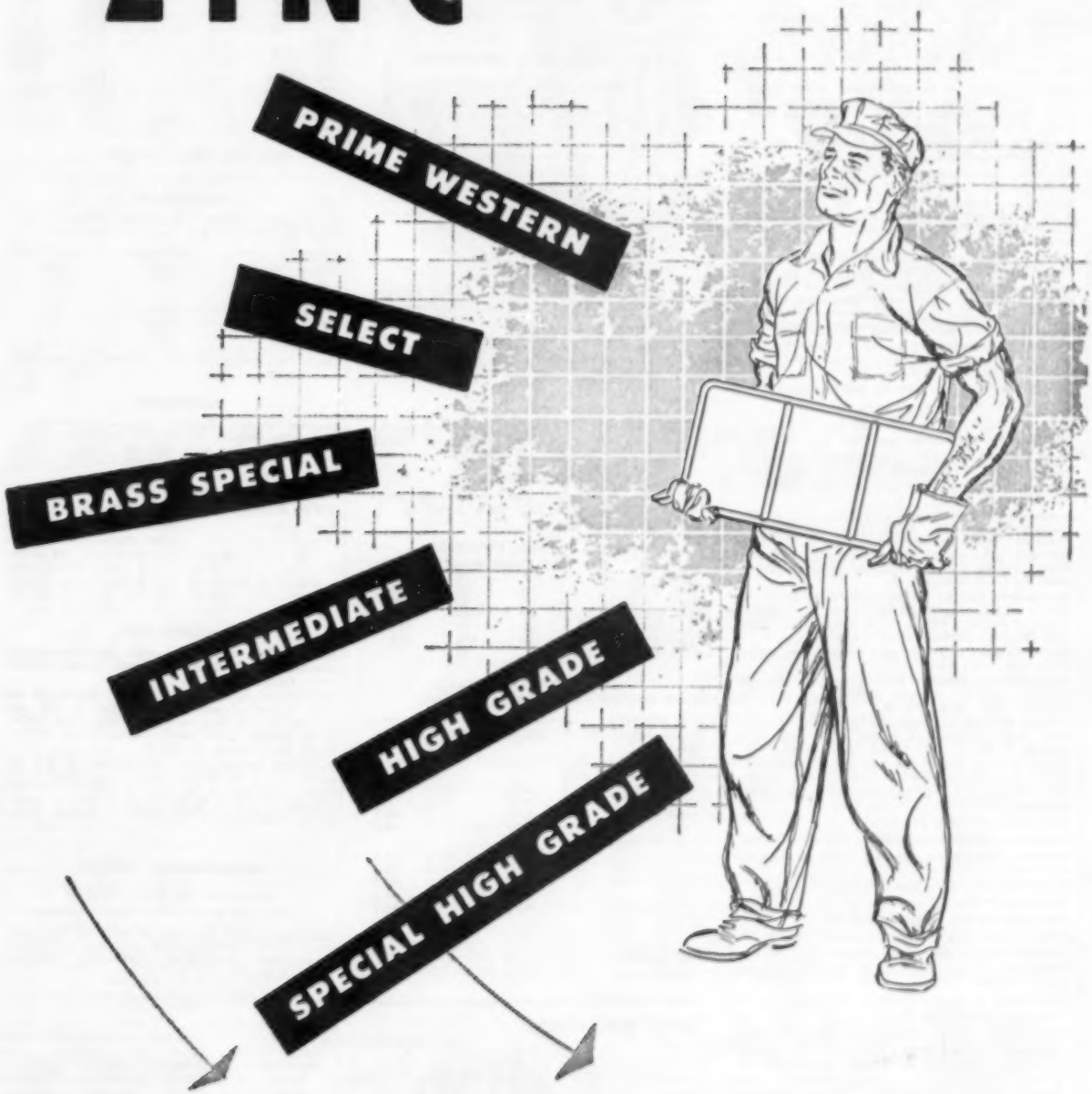
civilian requirements



AMERICAN ZINC SALES COMPANY

Distributors for

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, O. Chicago St. Louis New York

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 23.20, pigs 21.50 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 25.00; No. 43, 5% Si, 24.8; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 26.2; No. 195, 4.5% Cu, 0.6%, Si, 25.5; No. 214, 3.8% Mg, 26.2; No. 356, 7% Si, 0.3% Mg, 24.9.

Antimony: R.M.M. brand, 99.5% 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.; Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $118.30 per lb, nom.

Copper: Electrolytic 33.00 deld. Conn. Valley, 33.00 deld. Midwest; Lake 33.00 deld; Fire refined 32.75 deld.

Germanium: 99.9%, $384.84 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-$120 nom. per troy oz.

Lead: Common 14.80, chemical 14.90, corroding 14.90, St. Louis; N. Y. basis, add 0.20.

Lithium: 98%, $10-$14 per lb, depending on quantity.

Magnesium: 99.8%, self-palletizing pig 27.00; notched ingot 27.75, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., and Madison, Ill., add 1.20 for pig and 1.25 for ingot. Sticks 1.3 in. diameter, 46.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more, f.o.b. Freeport, Tex., or Madison, Ill. Add 1.20 for Port Newark, N. J.

Mercury: Open market, spot, New York, $322-$324, per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3-$3.25 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked 64.50; 10-lb pigs, unpacked 67.66; "XX" nickel shot 69.66; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $120-$130 nom. per troy oz.

Palladium: $17-$20 per troy oz.

Platinum: $78-$80 per troy oz from refineries.

Radium: $16-$21.80 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$56 per troy oz.

Selenium: 99.5%, $6-$7.25 per lb.

Silver: Open market, 85.25 per oz.

Sodium: 16.50, carlots; 17.00 l.c.l.

Tantalum: Sheet, rod $65.70 per lb; powder $40.20 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot 91.25, prompt 91.125.

Titanium: Sponge, 99.3 + %, grade A-1 ductile (0.3% Fe max) $4.50, grade A-2 (0.5% Fe max) $4 per pound.

Tungsten: Powder, 98.5%, carbon reduced, 1000 lb lots $4.35-$4.40 per lb nom., f.o.b. shipping point; less than 1000 lb add 15.0; 99 + % hydrogen reduced, $4.65. Treated ingots $6.70.

Zinc: Prime Western 11.50, brass special 11.75, intermediate 12.00, E. St. Louis, freight allowed over 0.50 per pound. High grade 13.90, special high grade 13.00, die casting alloy ingot 15.50, deld.

Zirconium: Sponge $10 per lb; powder electronics grade $15, flash grade $11.50.
(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloy 27.75-30.00; No. 12 foundry alloy (No. 2 grade) 26.50-28.00; 5% silicon alloy, 0.60 Cu max., 28.00-29.25; 13 alloy 0.60 Cu max., 28.00-29.25; 195 alloy 28.25-29.25; 108 alloy 28.25-28.50; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 28.00-29.50; grade 2, 27.25-28.50; grade 3, 26.50-27.50; grade 4, 26.00-27.00.

Brass Ingot: Red brass No. 115, 33.00; tin bronze No. 225, 43.50; No. 245, 37.75; high-leaded tin bronze, No. 305, 37.00; No. 1 yellow, No. 405, 28.75; manganese bronze No. 421, 30.75.

Magnesium Alloy Ingot: AZ63A, 31.00; AZ91B, 26.00; AZ91C, 31.00; AZ92A, 31.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.71; rod, bar, wire, $1.66.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 38.35; 30,000 lb lots, 38.48; l.c.l. 38.98. Weatherproof, 100,000 lb, 38.53; 30,000 lb, 38.73; l.c.l. 39.25. Magnet wire deld., 15,000 lb or more 44.99; l.c.l. 45.74.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more $20.00 per cwt; pipe, full coils $20.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forging billets $9; hot-rolled and forged bars, $9.

ZINC

(Prices per lb c.l., f.o.b. mill) Sheets 23.00, ribbon zinc in coils, 19.00-20.50; plates 18.00-22.25.

ZIRCONIUM

Plate $27; H.R. strip $28; C.R. strip $35; forged or H.R. bars $27; wire, 0.015 in., 1 cent per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	102	78	99
Strip, C.R.	102	87	125
Plate, H.R.	97	83	95
Rod, Shapes H.R.	87	69	93
Rod, Shapes C.R.	91	73	115
Seamless Tubes	123	108	153
Shot, Blocks		65	

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	63.5	62.0	...	...
0.156-0.172	53.9	52.3	...	...
0.188	53.9	52.3	...	66.8
0.219-0.234	51.1	49.5	...	...
0.250-0.281	51.1	49.5	...	63.7
0.313	51.1	49.5	...	60.8
Cold-finished				
0.375-0.547	49.9	47.5	59.5	57.2
0.563-0.688	49.9	47.5	56.9	53.7
0.750-1.000	48.7	46.3	52.1	50.4
1.063	48.7	46.3	...	48.9
1.125-1.500	46.9	44.6	50.4	48.9
Rolled				
1.563	45.7	43.4	...	...
1.625-2.000	45.1	42.8	...	47.2
2.125-2.500	44.0	41.7	...	...
2.563-3.375	42.7	40.5	...	...

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish c.l. (30,000 lb base; freight allowed over 499 lb)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.126	35.9	40.4	...	...
0.125-0.096	36.4	41.3	...	...
0.095-0.077	37.1	42.3	34.6	39.6
0.076-0.061	37.7	43.2	34.8	39.8
0.060-0.048	38.3	43.6	35.1	40.3
0.047-0.038	38.7	44.5	35.6	40.6
0.037-0.030	39.1	45.0	36.0	41.3
0.029-0.024	39.7	45.5	36.3	41.5
0.023-0.019	40.4	46.9	37.1	42.6
0.018-0.017	41.2	...	37.7	43.5
0.016-0.015	42.1	...	38.5	44.7
0.014	43.1	...	39.5	46.0
0.013-0.012	44.3	...	40.3	47.0
0.011	45.3	...	41.4	48.6
0.010-0.0095	46.5	...	42.5	50.3
0.009-0.0085	47.8	...	44.0	52.3
0.008-0.0075	49.4	...	45.3	54.1
0.007	50.9	...	46.7	56.4
0.006	52.5	...	48.1	61.4

*48 in. max. dia. †26 in. max. dia.

ALUMINUM

Plates and Circles: Thickness 0.250-3.0 in 24-60 in. width or dia, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	34.6	38.5
5050-F	35.7	39.9
3004-F	36.7	41.6
5052-F	38.4	43.4
6061-T6	39.6	44.9
2024-T4*	41.8	47.9
7075-T6*	49.6	56.2

*24-48 in. widths or dia., 72-180 in. lengths

ALUMINUM

Forging Stock: Round, Class 1, 47.6-37.3, in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 53.6-41 in random lengths 0.375-4.0 in. thick, widths 0.750-10 in.

Pipe: A.S.A. Schedule 40, alloy 6063-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
⅜	$16.10	2	$ 49.50
1	25.35	4	136.65
1¼	34.30	6	244.90
1½	41.00	8	368.50

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 94.00, 0.064-in. 73.00, 0.125-in. 60.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot-rolled AZ31, 55.00, 20,000 lb or more 0.250-in. and over widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in. 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ⅛-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in lots)

Aluminum: 1100 clippings 16.00-16.50; old sheet 13.00-13.50; borings and turnings 8.00-9.50; crankcases 13.00-13.50; industrial castings 13.00-13.50.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	51.76b	49.36	....	51.82	29.000	29.000	28.250
Yellow Brass	44.27	44.21	44.81	47.18	21.875	21.625	20.125
Red Brass, 85%	48.46	48.36	48.96	51.26	25.500	25.250	24.750
Low Brass, 80%	47.35	47.29	47.89	50.16	24.625	24.375	23.875
Naval Brass	48.16	42.49	55.24	51.34	20.250	20.000	19.500
Com. Bronze, 90%	50.06	50.02	50.62	52.64	26.625	26.375	25.875
Nickel Silver, 10%	58.26	62.25	62.56	....	26.000	25.750	13.000
Phos. Bronze, A, 5%	70.12	70.62	70.62	71.80	29.375	29.125	28.125
Silicon Bronze	56.94	56.13	56.98	57.86e	28.000	27.750	27.000
Manganese Bronze	51.92	46.02	56.46	....	20.375	20.125	19.500
Muntz Metal	46.34	42.15	....	....	20.625	20.375	19.875

a. Cents per lb f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 30,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Loaded.

Copper and Brass: Heavy copper and wire No. 1 29.50-30.00; No. 2 copper 28.00-28.50; light copper 26.00-26.50; No. 1 composition red brass 23.00-24.00; No. 1 composition turnings 22.50-23.50; yellow brass turnings 18.50; new brass clippings 20.50-21.00; No. 1 brass rod turnings 17.50-18.00; light brass 14.00-15.00; heavy yellow brass 17.00-18.50; new brass rod ends 18.00-19.00; auto radiators, unsweated 18.00-19.00; cocks and faucets 19.50-20.00; brass pipe 19.00-20.00.

Lead: Heavy 11.50-11.75; battery plate 6.00-6.50; linotype and stereotype 13.50-14.25; electrotype 12.00-12.50; mixed babbitt 12.00-12.50.

Magnesium: Clippings 18.50-19.50; clean castings 17.50-18.50; iron castings, not over 10% removable Fe, 15.50-16.50.

Monel: Clippings 28.00-35.00; old sheet 26.00-33.00; turnings 21.00; rods 28.00-35.00.

Nickel: Sheets and clips 57.00; rolled anodes 57.00-65.00; turnings 40.00-45.00; rod ends 57.00-65.00.

Tin: No. 1 pewter 50.00-55.00; block tin pipe 70.00-75.00; No. 1 babbitt 45.00-48.00.

Zinc: Old zinc 4.75-5.50; new die cast scrap, 4.75-5.00; old die cast scrap, 3.25-3.50.

REFINERS' BUYING PRICES

(Cents per pound, cariots, delivered refinery)

Aluminum: 1100 clippings 20.00-22.50; 3003 clippings 20.00-21.50; 6151 clippings 20.00-21.50; 5052 clippings 20.00-21.50; 2014 clippings 19.50-21.00; 2017 clippings 19.50-21.00; 2024 clippings 19.50-21.00; mixed clippings 17.50-20.00; old sheet 17.50-19.00; old cast 17.50-19.00; clean old cable (free of steel) 20.00-21.00; borings and turnings 17.50-19.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 45.0; light scrap 40.0.

Copper, Brass: No. 1 copper 33.50; No. 2 copper 32.0; light copper 30.50; refinery brass (60% copper) per dry copper content 28.00-28.50.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.70 per lb.

Copper: Flat-rolled 45.42, oval 47.92, 5000-10,000 lb; electrodeposited 42.78, cast 45.04, 1000-5000 lb lots.

Nickel: Depolarized, less than 100 lb $1.015; 100-499 lb 99.5; 500-4999 lb 95.5; 5000-29,999 lb 93.5; 30,000 lb 91.5. Carbonized, deduct 3 cents a lb. All prices eastern delivery effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb $1.095; 200-499 lb $1.08; 500-999 lb $1.075; 1000 lb or more $1.07.

Zinc: Bar 20.00, bar or flat top 19.00 ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.

Copper Cyanide: 100 lb 71.50; 200 lb 71.05; 300 lb 70.80; 400-900 lb 70.05; 1000 lb and over 68.05, effective Feb. 11, 1955.

Copper Sulphate: Crystal, 100 lb 20.5; 200 lb 17.5; 300 lb 16.5; 400 lb 16.0; 500-1900 14.5; 2000 to 10,000 lb 14.25; 10,000 and up 14.15. Powder, add .5 to above prices. Effective Jan. 31, 1955.

Nickel Chloride: 100 lb 46.5; 200 lb 44.5; 300 lb 43.5; 400-4900 lb 41.5; 5000-9900 lb 39.50; 10,000 lb and over 38.5. All prices eastern delivery effective Jan. 1, 1955.

Nickel Sulphate: 100 lb 38.25; 200 lb 36.25; 300 lb 35.25; 400-4930 lb 33.25; 5000-35,900 lb 31.25; 36,000 lb 30.25. All prices eastern delivery effective Jan. 1, 1955.

Silver Cyanide: Cents per ounce, 10 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.

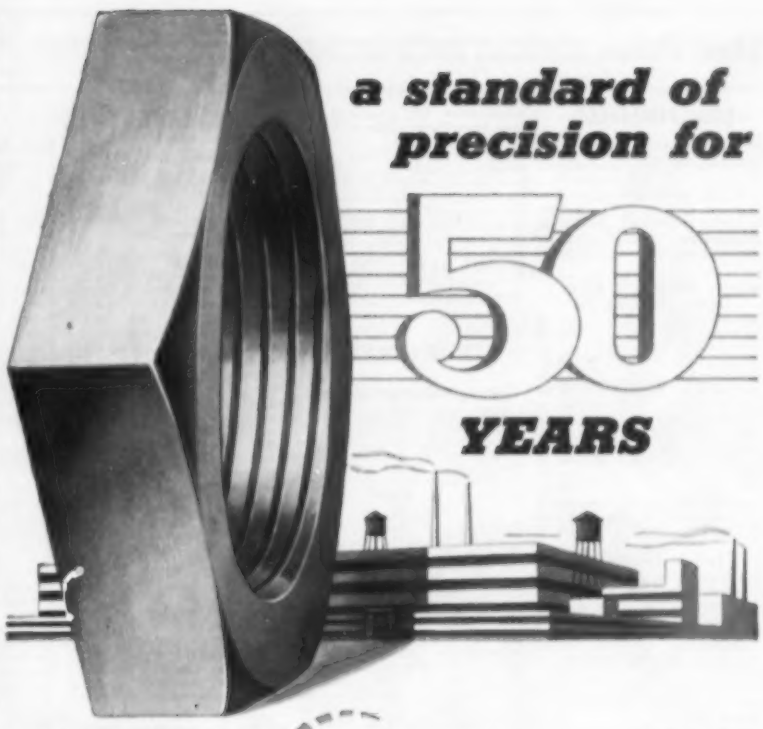
Sodium Cyanide: Egg, under 1000 lb 19.50; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb 70.1; 100-600 lb 55.9; 700-1900 lb 53.4, 2000-9900 lb 51.7; 10,000 lb or more 50.6.

Stannous Chloride (Anhydrous): Less than 50 lb $1.558; 50 lb $1.218, 100-300 lb $1.068, 400-900 lb $1.043; 1000-1900 lb $1.019; 2000-4900 lb 98.2; 5000-19,900 lb 92.1, 20,000 lb and over 86.0.

Stannous Sulphate: Less than 5 lb $1.258; 50 lb 95.8; 100-1900 lb 93.8; 2000 lb and over 91.8

Zinc Cyanide: Under 1000 lb 54.30; 1000 lb and over 52.30.



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C-216-FS

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; Key on page 141. Key to footnotes, page 143.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$61.50

INGOTS, Alloy (NT)

Detroit R7 .....$65.00
Houston 85 .....70.00
Midland,Pa. C18 .....65.00
Munhall,Pa. U5 .....65.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ....$64.00
Bessemer,Pa. U5 .....64.00
Bridgeport,Conn. N19 ..69.00
Buffalo R2 .....64.00
Clairton,Pa. U5 .....64.00
Ensley,Ala. T2 .....64.00
Fairfield,Ala. T2 .....64.00
Fontana,Calif. K1 ....72.00
Gary,Ind. U5 .....64.00
Johnstown,Pa. B2 .....64.00
Lackawanna,N.Y. B2 ..64.00
Munhall,Pa. U5 .....64.00
Pittsburgh J5 .....64.00
So.Chicago,Ill. R2, U5..64.00
So.Duquesne,Pa. U5 ...64.00
Youngstown R2 .....64.00

Carbon, Forging (NT)

Aliquippa,Pa. J5 ....$78.00
Bessemer,Pa. U5 .....78.00
Bridgeport,Conn. N19 ..83.00
Buffalo R2 .....78.00
Canton,O. R2 .....80.00
Clairton,Pa. U5 .....78.00
Conshohocken,Pa. A3 ..83.00
Ensley,Ala. T2 .....78.00
Fairfield,Ala. T2 .....78.00
Fontana,Calif. K1 ....86.00
Gary,Ind. U5 .....78.00
Geneva,Utah C11 .....78.00
Houston 85 .....83.00
Johnstown,Pa. B2 .....78.00
Lackawanna,N.Y. B2 ..78.00
LosAngeles B3 .....87.50
Midland,Pa. C18 .....78.00
Munhall,Pa. U5 .....78.00
Pittsburgh J5 .....78.00
Seattle B3 .....91.50
So.Chicago R2,U5,W14..78.00
So.Duquesne,Pa. U5 ...78.00
So.SanFrancisco B3 ...87.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ....$86.00
Buffalo R2 .....86.00
Canton,O. R2, T7 ....86.00
Conshohocken,Pa. A3 ..93.00
Detroit R7 .....86.00
Fontana,Calif. K1 ....105.00
Gary,Ind. U5 .....86.00
Houston 85 .....91.00
Ind.Harbor,Ind. Y1 ...86.00
Johnstown,Pa. B2 .....86.00
Lackawanna,N.Y. B2 ..86.00
LosAngeles B3 .....105.00
Massillon,O. R2 .....86.00
Midland,Pa. C18 .....86.00
Munhall,Pa. U5 .....86.00
So.Chicago, R2,U5,W14..86.00
So.Duquesne,Pa. U5 ...86.00
Struthers,O. Y1 .....88.00
Warren,O. C17 .....86.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$96.50
Canton,O. R2 .....96.50
Cleveland R2 .....96.50
Gary,Ind. U5 .....96.50
So.Chicago R2, W14 ...96.50
So.Duquesne, Pa. U5 ...96.50

SKELP

Aliquippa,Pa. J5 .....4.00
Fontana,Calif. K1 ....4.775
Munhall,Pa. U5 .....3.90
SparrowsPoint,Md. B2 ..3.90
Warren,O. R2 .....3.90
Youngstown R2, U5 ....3.90

WIRE RODS

AlabamaCity,Ala. R2 ..4.675
Aliquippa,Pa. J5 .....4.675
Alton,Ill. L1 .....4.85
Buffalo B11, W12 ....4.675
Cleveland A7 .....4.675
Donora,Pa. A7 .....4.675
Fairfield,Ala. T2 .....4.675
Fontana,Calif. K1 ....5.475
Houston 85 .....4.925
IndianaHarbor,Ind. Y1 .4.675
Johnstown,Pa. B2 .....4.675
Joliet,Ill. A7 .....4.675
KansasCity,Mo. S5 ....4.925
Kokomo,Ind. C16 .....4.775
LosAngeles B3 .....5.475
Minnequa,Colo. C10 ...4.925
Monessen,Pa. P7 .....4.675
No.Tonawanda,N.Y.B11 4.675
Pittsburg,Calif. C11 ...5.225
Portsmouth P12 .....4.675
Roebling,N.J. R5 .....4.775
So.Chicago,Ill. R2 .....4.675
SparrowsPoint,Md. B2 ..4.775
Sterling,Ill.(1) N15 ....4.675
Sterling,Ill. N15 .....4.775
Struthers,O. Y1 .....4.675
Torrance,Calif. C11 ....5.475
Worcester,Mass. A7 ...4.975

STRUCTURALS

Carbon Steel Stand. Shapes

Ala.City,Ala. R2 .....4.25
Aliquippa,Pa. J5 .....4.25
Bessemer,Ala. T2 .....4.25
Bethlehem,Pa. B2 .....4.30
Birmingham C15 .....4.25
Clairton,Pa. U5 .....4.25
Fairfield,Ala. T2 .....4.25
Fontana,Calif. K1 .....4.90
Gary,Ind. U5 .....4.25
Geneva,Utah C11 .....4.25
Houston 85 .....4.30
Ind.Harbor,Ind. I-2 ....4.25
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 .....4.30
Lackawanna,N.Y. B2 ...4.30
LosAngeles B3 .....4.95
Minnequa,Colo. C10 ....4.70
Munhall,Pa. U5 .....4.25
Niles,Calif. P1 .....4.90
Phoenixville,Pa. P4 ....3.95
Portland,Oreg. O4 .....5.00
Seattle B3 .....5.00
So.Chicago U5, W14 ....4.25
So.SanFrancisco B3 ....4.90
Torrance,Calif. C11 ....4.95
Weirton,W.Va. W6 .....4.25

Wide Flange

Bethlehem,Pa. B2 .....4.30
Clairton,Pa. U5 .....4.25
Fontana,Calif. K1 .....5.25
Lackawanna,N.Y. B2 ...4.30
Munhall,Pa. U5 .....4.25
Phoenixville,Pa. P4 ....4.30
So.Chicago,Ill. U5 .....4.25

Alloy Stand. Shapes

Clairton,Pa. U5 .....5.20
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.20
Houston 85 .....5.25
Munhall,Pa. U5 .....5.20
So.Chicago,Ill. U5 .....5.20

H.S., L.A. Stand. Shapes

Aliquippa,Pa. J5 .....6.40
Bessemer,Ala. T2 .....6.40
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.40
Fairfield,Ala. T2 .....6.40
Fontana,Calif. K1 .....7.05
Gary,Ind. U5 .....6.40
Geneva,Utah C11 .....6.40
Houston 85 .....6.45
Ind.Harbor,Ind. I-2, Y1..6.40
Johnstown,Pa. B2 .....6.45
KansasCity,Mo. S5 .....6.45
Lackawanna,N.Y. B2 ...6.45
LosAngeles B3 .....7.10
Munhall,Pa. U5 .....6.40
Seattle B3 .....7.15
So.Chicago,Ill. U5, W14..6.40
So.SanFrancisco B3 ....7.05
Struthers,O. Y1 .....6.40

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ...6.45
Munhall,Pa. U5 .....6.40
So.Chicago,Ill. U5 .....6.40

PILING

BEARING PILES

Munhall,Pa. U5 .....4.25
So.Chicago,Ill. U5 .....4.25

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ....5.075
Lackawanna,N.Y. B2 ...5.075
Munhall,Pa. U5 .....5.075
So.Chicago,Ill. U5 .....5.075

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 .....4.225
Aliquippa,Pa. J5 .....4.225
Ashland,Ky.(15) A10 ..4.225
Bessemer,Ala. T2 .....4.225
Bridgeport,Conn. N19 ..4.475
Buffalo R2 .....4.225
Clairton,Pa. U5 .....4.225
Claymont,Del. C22 .....4.225
Cleveland J5, R2 .....4.225
Coatesville,Pa. L7 .....4.225
Conshohocken,Pa. A3 ..4.225
Ecorse,Mich. G5 .....4.325
Fairfield,Ala. T2 .....4.225
Fontana,Calif.(30) K1..4.875
Gary,Ind. U5 .....4.225
Geneva,Utah C11 .....4.225
GraniteCity,Ill. G4 ....4.425
Harrisburg,Pa. C5 ....3.975
Houston 85 .....4.275
Ind.Harbor,Ind. I-2, Y1..4.225
Johnstown,Pa. B2 .....4.225
Lackawanna,N.Y. B2 ...4.225
LoneStar,Tex. L6 .....4.55
Mansfield,O. E8 .....4.225
Minnequa,Colo. C10 ....5.075
Munhall,Pa. U5 .....4.225
Newport,Ky. N9 .....4.225
Pittsburgh J5 .....4.225
Riverdale,Ill. A1 .....4.225
Seattle B3 .....5.125
Sharon,Pa. S3 .....4.225
So.Chicago,Ill. R2 .....4.225
So.Chicago,Ill. U5,W14..4.225
SparrowsPoint,Md. B2..4.225
Steubenville,O. W10 ..4.225
Warren,O. R2 .....4.225
Weirton,W.Va. W6 .....4.225
Youngstown R2,U5,Y1..4.225

PLATES, Carbon Abras. Resist.

Fontana,Calif. K1 ....6.025
Geneva,Utah C11 .....5.375

PLATES, Wrought Iron

Economy,Pa. B14 .....9.80

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland J5, R2 .....6.45
Coatesville,Pa. L7 .....6.45
Conshohocken,Pa. A3 ..6.45
Ecorse,Mich. G5 .....6.55
Fairfield,Ala. T2 .....6.45
Fontana,Calif.(30) K1 ..7.15
Gary,Ind. U5 .....6.45
Geneva,Utah C11 .....6.45
Houston 85 .....6.50
Ind.Harbor,Ind. I-2, Y1..6.45
Johnstown,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ...6.45
LosAngeles B3 .....7.35
Munhall,Pa. U5 .....6.45
Pittsburgh J5 .....6.45
Seattle B3 .....7.35
Sharon,Pa. S3 .....6.45
So.Chicago,Ill. U5, W14..6.45
SparrowsPoint,Md. B2...6.45
Youngstown U5, Y1 ....6.45

PLATES, Alloy

Claymont,Del. C22 ....5.80
Coatesville,Pa. L7 .....5.80
Fontana,Calif. K1 .....6.45
Gary,Ind. U5 .....5.80
Houston 85 .....5.85
Ind.Harbor,Ind. Y1 ....5.80
Johnstown,Pa. B2 .....5.80
Munhall,Pa. U5 .....5.80
Newport,Ky. N9 .....5.80
Seattle B3 .....6.70
Sharon,Pa. S3 .....5.80
So.Chicago,Ill. U5, W14..5.80
SparrowsPoint,Md. B2..5.80
Youngstown Y1 .....5.80

FLOOR PLATES

Cleveland J5 .....5.275
Conshohocken,Pa. A3 ..5.275
Harrisburg,Pa. C5 ....5.15
Ind.Harbor,Ind. I-2 ....5.275
Munhall,Pa. U5 .....5.275
So.Chicago,Ill. U5 .....5.275

PLATES, Ingot Iron

Ashland c.l. (15) A10..4.475
Ashland l.c.l. (15) A10..4.975
Cleveland c.l. R2 .....4.825
Warren,O. c.l. R2 .....4.825

BARS

BARS, Hot-Rolled Carbon

Ala.City,Ala. R2 .....4.30
Aliquippa,Pa. J5 .....4.30
Alton,Ill. L1 .....4.50
Atlanta,Ga. A11 .....4.50
Bessemer,Ala. T2 .....4.30
Birmingham C15 .....4.30
Bridgeport,Conn. N19 ...4.55
Buffalo R2 .....4.30
Canton,O. R2 .....4.40
Clairton,Pa. U5 .....4.30
Cleveland R2 .....4.30
Ecorse,Mich. G5 .....4.40
Emeryville,Calif. J7 ...5.05
Fairfield,Ala. T2 .....4.30
FairlessHills,Pa. U5 ....4.45
Fontana,Calif. K1 .....5.00
Gary,Ind. U5 .....4.30
Houston 85 .....4.55
Ind.Harbor,Ind. I-2, Y1..4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 .....4.55
Lackawanna,N.Y. B2 ...4.30
LosAngeles B3 .....5.00
Massillon,O. R2 .....4.40
Midland,Pa. C18 .....4.30
Milton,Pa. M18 .....4.30
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....5.00
N.Tonawanda,N.Y. B11..4.30
Pittsburg,Calif. C11 ....5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
Seattle B3, N14, P23 ..5.05
So.Chicago, R2,U5,W14..4.30
So.Duquesne,Pa. U5 ....4.30
So.SanFran.,Calif. B3 ..5.05
Sterling,Ill.(1) N15 ....4.30
Sterling,Ill. N15 .....4.40
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Warren,O. R2 .....4.30
Weirton,W.Va. W6 .....4.30
Youngstown R2, U5 ....4.30

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ....5.075
Bridgeport,Conn. N19 ..5.225
Buffalo R2 .....5.075
Canton,O. R2, T7 ....5.075
Clairton,Pa. U5 .....5.075
Detroit R7 .....5.075
Ecorse,Mich. G5 .....5.175
Fontana,Calif. K1 .....6.125
FairlessHills,Pa. U5 ..5.225
Gary,Ind. U5 .....5.075
Houston 85 .....5.325
Ind.Harbor,Ind. I-2, Y1..5.075
Johnstown,Pa. B2 .....5.075
KansasCity,Mo. S5 .....5.325
Lackawanna,N.Y. B2 ...5.075
LosAngeles B3 .....6.125
Massillon,O. R2 .....5.075
Midland,Pa. C18 .....5.075
So.Chicago R2, U5,W14 5.075
So.Duquesne,Pa. U5 ...5.075
Struthers,O. Y1 .....5.075
Warren,O. C17 .....5.075
Youngstown U5 .....5.075

BARS, H.R. Loaded Alloy

Warren,O. C17 .....5.825

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.46
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland R2 .....6.45
Ecorse,Mich. G5 .....6.55
Fairfield,Ala. T2 .....6.45
Fontana,Calif. K1 .....7.70
Gary,Ind. U5 .....6.45
Houston 85 .....6.70
Ind.Harb.,Ind. I-2, Y1..6.45
Johnstown,Pa. B2 .....6.45
KansasCity,Mo. S5 .....6.70
Lackawanna,N.Y. B2 ...6.45
LosAngeles B3 .....7.15
Pittsburgh J5 .....6.45
Seattle B3 .....7.20
So.Chicago W14 .....6.45
So.Duquesne,Pa. U5 ....6.45
So.SanFrancisco B3 ....7.20
Struthers,O. Y1 .....6.45
Warren,O. R2 .....6.45
Youngstown U5 .....6.45

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2 .....4.45

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....4.30
Atlanta A11 .....4.50
Fontana,Calif. K1 .....5.00
Niles,Calif. P1 .....5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
SanFrancisco S7 .....4.70

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 .....5.20
Gary,Ind. U5 .....5.20
Houston 85 .....5.25
KansasCity S5 .....5.45
Youngstown U5 .....5.20

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12, R2 5.40
Buffalo B5 .....5.45
Camden,N.J. P13 .....5.85
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7, C20 .....5.40
Detroit R7 .....5.40
Detroit B5, P17 .....5.90
Donora,Pa. A7 .....5.40
Elyria,O. W8 .....5.40
FranklinPark,Ill. N5 ....5.40
Gary,Ind. R2 .....5.40
GreenBay,Wis. F7 .....5.40
Hammond,Ind. L2, M13 5.40
Hartford,Conn. R2 .....5.90
Harvey,Ill. B5 .....5.40
LosAngeles R2, S30 ....6.85
Mansfield,Mass. B5 ....5.95
Massillon,O. R2, R8 ....5.40
Midland,Pa. C18 .....5.40
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.85
NewCastle,Pa.(17) B4 ..5.40
Pittsburgh J5 .....5.40
Plymouth,Mich. P5 ....5.65
Putnam,Conn. W18 ....5.95
Readville,Mass. C14 ....5.95
So.Chicago,Ill. W14 ....5.40
SpringCity,Pa. K3 .....5.85
Struthers,O. Y1 .....5.40
Waukegan,Ill. A7 .....5.40
Worcester,Mass. W19 ....5.85
Youngstown F3, Y1 ....5.40

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19..4.65

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....6.625
BeaverFalls,Pa. M12,R2 6.625
Bethlehem,Pa. B2 .....6.625
Buffalo B5 .....6.625
Camden,N.J. P13 .....6.80
Canton,O. T7 .....6.625
Carnegie,Pa. C12 .....6.625
Chicago W18 .....6.625
Cleveland A7, C20 .....6.625
Detroit R7 .....6.625
Detroit B5, P17 .....6.825
Donora,Pa. A7 .....6.625
Elyria,O. W8 .....6.625
Gary,Ind. R2 .....6.625
GreenBay,Wis. F7 .....6.625
Hammond,Ind. L2, M13 6.625
Hartford,Conn. R2 .....6.925
Harvey,Ill. B5 .....6.825
Lackawanna,N.Y. B2 ..6.625
LosAngeles S30 .....8.50
Mansfield,Mass. B5 ..6.925
Massillon,O. R2, R8 ..6.625
Midland,Pa. C18 .....6.625
Monaca,Pa. S17 .....6.625
Newark,N.J. W18 .....6.80
Plymouth,Mich. P5 ....6.825
So.Chicago W14 .....6.625
SpringCity,Pa. K3 .....6.80
Struthers,O. Y1 .....6.625
Warren,O. C17 .....6.625
Waukegan,Ill. A7 .....6.625
Worcester,Mass. A7 ..6.925
Youngstown F3, Y1 ....6.625

BARS, C.F. Loaded Alloy

Ambridge,Pa. W18 ....7.525
Camden,N.J. P13 .....7.70
Carnegie,Pa. C12 .....7.525
Chicago W18 .....7.525
Cleveland C20 .....7.525
Monaca,Pa. S17 .....7.525
Newark,N.J. W18 .....7.70
SpringCity,Pa. K3 .....7.70
Warren,O. C17 .....7.525

BARS, Reinforcing (To fabricators)

Ala.City,Ala. R2 .....4.30
Atlanta A11 .....4.50
Birmingham C15 .....4.30
Buffalo R2 .....4.30
Cleveland R2 .....4.30
Emeryville,Calif. J7 ....5.05
Fairfield,Ala. T2 .....4.30
FairlessHills,Pa. U5 ....4.45
Fontana,Calif. K1 .....5.00
Ft.Worth,Tex.(42) T4 ..4.90
Gary,Ind. U5 .....4.30
Houston 85 .....4.55

Ind.Harbor,Ind. I-2, Y1..4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 .....4.55
Lackawanna,N.Y. B2 ...4.30
LosAngeles B3 .....5.00
Milton,Pa. M18 .....4.30
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....5.00
Pittsburg,Calif. C11 ....5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
SandSprings,Okla. S5 ..4.80
Seattle B3, N14, P23 ...5.05
So.Chicago R2 .....4.30
So.Duquesne,Pa. U5 ....4.30
So.SanFrancisco B3 ....5.05
SparrowsPoint,Md. B2..4.30
Sterling,Ill.(1) N15 ....4.30
Sterling,Ill. N15 .....4.40
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Youngstown R2, U5 ....4.30

BARS, Reinforcing
(Fabricated to Consumers)

Johnstown,Pa. ½-1" B2 5.70
KansasCity S5 .....6.50
LosAngeles B3 .....5.95
Marion,O. P11 .....5.55
Pittsburgh J5, U5 .....5.72
Seattle B3, N14, P23 ...6.15
So.SanFrancisco B3 ....6.00
SparrowsPt. ½-1" B2..5.70
Williamsport,Pa. S19 ...5.60

RAIL STEEL BARS

Avis,Pa.(3) J3 .....4.25
ChicagoHts.(3) C2, I-2..4.20
ChicagoHts.(4) C2, I-2..4.30
Ft.Worth,Tex.(26) T4 ..4.75
Franklin,Pa.(3) P5 ....4.30
Franklin,Pa.(4) P5 ....4.30
Marion,O.(3) P11 .....4.15
Moline,Ill.(3) R2 .....4.30
Tonawanda(3) B12 .....4.15
Tonawanda(4) B12 .....4.30
Williamsport,Pa.(3) S19 .4.30

BARS, Wrought Iron

Economy,Pa.(S.R.) B14 10.85
Economy,Pa.(D.R.) B14 13.50
Economy(Staybolt) B14 13.80
McK.Rks.(S.R.) L5 ....10.85
McK.Rks.(D.R.) L5 ..14.75
McK.Rks.(Staybolt) L5 16.25

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala.City,Ala. R2 .....4.05
Allenport,Pa. P7 .....4.05
Ashland,Ky.(8) A10 ....4.05
Cleveland J5, R2 .....4.05
Conshohocken,Pa. A3 ..4.10
Detroit(5) M1 .....4.15
Ecorse,Mich. G5 .....4.15
Fairfield,Ala. T2 .....4.05
FairlessHills,Pa. U5 ....4.10
Fontana,Calif. K1 ....4.825
Gary,Ind. U5 .....4.05
Geneva,Utah C11 .....4.15
GraniteCity,Ill. G4 .....4.25
Ind.Harbor,Ind. I-2, Y1..4.05
Irvin,Pa. U5 .....4.05
Kokomo,Ind. C16 .....4.15
Lackawanna,N.Y. B2 ..4.05
Mansfield,O. E6 (37) ..4.05
Mansfield,O. E6(38) ...4.60
Munhall,Pa. U5 .....4.05
Newport,Ky. N9 .....4.05
Niles,O. N12 .....4.05
Pittsburg,Calif. C11 ....4.75
Pittsburgh J5 .....4.05
Portsmouth,O. P12 .....4.05
Riverdale,Ill. A1 .....4.05
Sharon,Pa. S3 .....4.05
So.Chicago,Ill. W14 ....4.05
SparrowsPoint,Md. B2 ..4.05
Steubenville,O. W10 ....4.05
Warren,O. R3 .....4.05
Weirton,W.Va. W6 ....4.05
Youngstown U5, Y1 ....4.05

SHEETS, H.R. (19 ga. lighter)

Ala.City,Ala. R2 .....5.35
Kokomo,Ind. C16 .....5.20
Niles,O. N12 .....4.95

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 .....5.80
Youngstown Y1 .....5.80

SHEETS, H.R. (14 ga. heavier)
High-Strength Low-Alloy

Cleveland J5, R2 .....6.10
Conshohocken,Pa. A3 ...6.15
Ecorse,Mich. G5 .....6.20
Fairfield,Ala. T2 .....6.10
FairlessHills,Pa. U5 ....6.15
Fontana,Calif. K1 .....6.875
Gary,Ind. U5 .....6.10
Ind.Harbor,Ind. I-2, Y1..6.10
Irvin,Pa. U5 .....6.10
Lackawanna(35) B2 ....6.10
Munhall,Pa. U5 .....6.10
Pittsburgh J5 .....6.10
Sharon,Pa. S3 .....6.10
So.Chicago,Ill. U5 .....6.10
SparrowsPoint(36) B2...6.10
Warren,O. R2 .....6.10
Weirton,W.Va. W6 ....6.10
Youngstown U5, Y1 ....6.10

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 ....4.30
Cleveland R2 .....4.65
Ind.Harbor,Ind. I-2 ....4.30
Warren,O. R2 .....4.65

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 .....4.85
Cleveland J5, R2 .....4.95
Conshohocken,Pa. A3 ...5.00
Ecorse,Mich. G5 .....5.05
Fairfield,Ala. T2 .....4.95
FairlessHills,Pa. U5 ....5.00
Follansbee,W.Va. F4 ...4.95
Fontana,Calif. K1 .....6.05
Gary,Ind. U5 .....4.95
GraniteCity,Ill. G4 .....5.15
Ind.Harbor,Ind. I-2, Y1..4.95
Irvin,Pa. U5 .....4.95
Lackawanna,N.Y. B2 ..4.95
Middletown,O. A10 .....4.95
Newport,Ky. N9 .....4.95
Pittsburg,Calif. C11 ....5.90
Pittsburgh J5 .....4.95
Portsmouth,O. P12 .....4.95
SparrowsPoint,Md. B2..4.95
Warren,O. R2 .....4.95
Weirton,W.Va. W6 ....4.95
Youngstown Y1 .....4.95

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 .....7.50
Ecorse,Mich. G5 .....7.60
FairlessHills,Pa. U5 ....7.55
Fontana,Calif. K1 .....8.55
Gary,Ind. U5 .....7.50
IndianaHarbor,Ind. Y1..7.50
Irvin,Pa. U5 .....7.50
Lackawanna(37) B2 ....7.50
Pittsburgh J5 .....7.50
SparrowsPoint(38) B2 ..7.50
Warren,O. R2 .....7.50
Weirton,W.Va. W6 ....7.50
Youngstown Y1 .....7.50

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....5.55
Middletown,O. A10 .....5.45
Warren,O. R2 .....5.55

SHEETS, Culvert (16 Ga.)

	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.50	....
Canton,O. R2	6.50	7.10
Fairfield T2	5.70	....
Gary,Ind. U5	5.70	5.95
Ind.Harbor I-2	5.70	5.95
Irvin,Pa. U5	5.70	....
Kokomo,Ind. C16	5.80	....
MartinsFry.,O. W10	5.70	....
Newport,Ky. N9	5.70	5.95
Pitts.,Calif. C11	6.45	....
SparrowsPt. B2	5.70	....

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 .....6.75
Gary,Ind. U5 .....5.95
MartinsFerry,O. W10 ..5.95

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City,Ala. R2 .....5.65‡
Ashland,Ky. A10 .....5.45*
Butler,Pa. A10 .....5.45†
Canton,O. R2 .....5.45‡
Delphos,O. N16 .....6.10‡
Dover,O. R1 .....5.45‡
Fairfield,Ala. T2 .....5.45†
Gary Ind. U5 .....5.45*
GraniteCity,Ill. G4 ....5.65‡
Ind.Harbor,Ind. I-2 ...5.45†
Irvin,Pa. U5 .....5.45†
Kokomo,Ind. C16 .....5.55‡
MartinsFerry,O. W10 ..5.45*
Middletown,O. A10 ...5.45†
Newport,Ky. N9 .....5.45†
Niles,O. N12 .....5.45‡
Pittsburg,Calif. C11 ...6.20*
SparrowsPt.,Md. B2 ..5.45‡
Weirton,W.Va. W6 ....5.45*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 .... 6.325

SHEETS, Galvanized
High-Strength Low-Alloy

Irvin,Pa. U5 .....5.20
SparrowsPoint(39) B2 ..5.30

SHEETS, Galvannealed Steel

Canton,O. R2 .....5.85
Irvin,Pa. U5 .....5.85
Kokomo,Ind. C16 .....6.20
Newport,Ky. N9 .....5.85
Niles,O. N12 .....5.85

SHEETS, Galvanized Ingot Iron

Ashland,Ky.(8) A10 ...5.70
Canton,O. R2 .....6.20

SHEETS, Galvanized
Ingot Iron
(Hot-Dipped Continuous)

Ashland,Ky. A10 .....5.70
Butler,Pa. A10 .....5.70
Middletown,O. A10 ....5.70

SHEETS, Electrogalvanized

Cleveland(28) R2 .....6.30
Niles,O.(28) R2 .....6.30
Weirton,W.Va. W6 ....6.15

SHEETS, Aluminum Coated

Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ...5.375
Cleveland R2 .....5.375
Gary,Ind. U5 .....5.375
GraniteCity,Ill. G4 ....5.575
Ind.Harbor,Ind. I-2 ...5.375
Irvin,Pa. U5 .....5.375
Middletown,O. A10 ....5.375
Niles,O. N12 .....5.375
Youngstown Y1 .....5.375

BLUED STOCK, 29 ga.

Follansbee,W.Va. F4 ..7.375
Follansbee(23) F4 .....6.60
Yorkville,O. W10 .....7.375

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va. W10 5.85
Gary,Ind. U5 .....5.85
Mansfield,O. E6 .....5.85
Middletown,O. A10 ....5.85
Niles,O. N12 .....5.85
Weirton,W.Va. W6 ....5.85

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .... 6.35

SHEETS, Galvanized
High-Strength Low-Alloy

Irvin,Pa. U5 .....5.20
SparrowsPoint(39) B2 ..5.30

SHEETS, Galvannealed Steel

Canton,O. R2 .....5.85
Irvin,Pa. U5 .....5.85
Kokomo,Ind. C16 .....6.20
Newport,Ky. N9 .....5.85
Niles,O. N12 .....5.85

SHEETS, Galvanized Ingot Iron

Ashland,Ky.(8) A10 ...5.70
Canton,O. R2 .....6.20

SHEETS, Galvanized
Ingot Iron
(Hot-Dipped Continuous)

Ashland,Ky. A10 .....5.70
Butler,Pa. A10 .....5.70
Middletown,O. A10 ....5.70

SHEETS, Electrogalvanized

Cleveland(28) R2 .....6.30
Niles,O.(28) R2 .....6.30
Weirton,W.Va. W6 ....6.15

SHEETS, Aluminum Coated

Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ...5.375
Cleveland R2 .....5.375
Gary,Ind. U5 .....5.375
GraniteCity,Ill. G4 ....5.575
Ind.Harbor,Ind. I-2 ...5.375
Irvin,Pa. U5 .....5.375
Middletown,O. A10 ....5.375
Niles,O. N12 .....5.375
Youngstown Y1 .....5.375

BLUED STOCK, 29 ga.

Follansbee,W.Va. F4 ..7.375
Follansbee(23) F4 .....6.60
Yorkville,O. W10 .....7.375

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va. W10 5.85
Gary,Ind. U5 .....5.85
Mansfield,O. E6 .....5.85
Middletown,O. A10 ....5.85
Niles,O. N12 .....5.85
Weirton,W.Va. W6 ....5.85

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .... 6.35

Key to Producers

A1 Acme Steel Co.
A2 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A6 American Shim Steel Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B9 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div. Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C31 Chester Blast Furnace Inc.

D2 Detroit Steel Corp.
D2 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro MetAllurgical Co.
E5 Elliott Bros. Steel Co.
E9 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Frets-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman & Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.High Carb. Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P23 Pacific Steel Rolling

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W.Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.05
Allenport,Pa. P7	4.05
Alton,Ill. L1	4.225
Ashland,Ky.(8) A10	4.05
Atlanta A11	4.25
Bessemer,Ala. T2	4.05
Birmingham C15	4.05
Bridgeport,Conn. N19	4.25
Buffalo(27) R2	4.05
Conshohocken,Pa. A3	4.10
Detroit M1	4.15
Ecorse,Mich. G5	4.15
Fairfield,Ala. T2	4.05
Fontana,Calif. K1	4.825
Gary,Ind. U5	4.05
Ind.Harbor,Ind. I-2, Y1	4.05
Johnstown,Pa.(25) B2	4.05
Lackaw'na,N.Y.(25) B2	4.05
LosAngeles(25) B3	4.80
Milton,Pa. M18	4.05
Minnequa,Colo. C10	5.15
N.Tonawanda,N.Y. B11	4.05
Pittsburg,Calif. C11	4.80
Portsmouth,O. P12	4.05
Riverdale,Ill. A1	4.05
SanFrancisco S7	5.00
Seattle(25) B3, P23	5.05
Seattle N14	5.05
Sharon,Pa. S3	4.05
So.Chicago,Ill. W14	4.05
So.SanFrancisco(25) B3	4.80
SparrowsPoint,Md. B2	4.05
Sterling(1) N15	4.05
Sterling,Ill. N15	4.15
Torrance,Calif. C11	4.80
Warren,O. R2	4.05
Weirton,W.Va. W6	4.05
Youngstown U5	4.05

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.00
Carnegie,Pa. S18	6.70
Fontana,Calif. K1	8.10
Gary,Ind. U5	6.70
Ind.Harbor,Ind. Y1	6.70
LosAngeles B3	7.90
Newport,Ky. N9	6.70
Seattle P23	7.80
Sharon,Pa. S3	6.70
So.Chicago W14	6.70
Youngstown U5, Y1	6.70

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	6.15
Conshohocken,Pa. A3	6.15
Ecorse,Mich. G5	6.25
Fairfield,Ala. T2	6.15
Fontana,Calif. K1	7.20
Gary,Ind. U5	6.15
Houston S5	6.40
Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.40
Lackawanna,N.Y. B2	6.15
LosAngeles(25) B3	6.90
Seattle(25) B3, P23	7.15
Sharon,Pa. S3	6.15
So.SanFrancisco(25) B3	6.90
SparrowsPoint,Md. B2	6.15
Warren,O. R2	6.15
Weirton,W.Va. W6	6.15
Youngstown U5, Y1	6.15

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.30
Warren,O. R2	4.65

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	5.75
Baltimore T6	5.75
Boston T6	6.30
Cleveland A7, J5	6.75
Conshohocken,Pa. A3	5.80
Dearborn,Mich. D3	5.85
Detroit P20	5.95
Detroit D2, M1	5.85
Dover,O. G6	5.75
Ecorse,Mich. G5	5.85
Follansbee,W.Va. F4	5.75
Fontana,Calif. K1	7.65
FranklinPark,Ill. T6	5.85
Ind.Harbor,Ind. I-2	5.85
Ind.Harbor,Ind. Y1	5.75
Indianapolis C8	5.90
Lackawanna,N.Y. B2	5.75
LosAngeles C1	7.50
Middletown,O. A10	5.75
NewBedford,Mass. R10	6.20
NewBritain(10) S15	5.75
NewCastle,Pa. B4, E5	5.75
NewHaven,Conn. A7	6.50
NewHaven,Conn. D2	6.20
NewKensington,Pa. A6	5.75
Pawtucket,R.I. R3	6.40
Pawtucket,R.I. N8	6.30
Pittsburgh J5	5.75
Portsmouth,O. P12	5.75
Riverdale,Ill. A1	5.85
Rome,N.Y.(32) R6	5.75
Sharon,Pa. S3	5.75
SparrowsPt.,Md. B2	5.75
Trenton,N.J.(31) R5	7.20
Wallingford,Conn. W2	6.20
Warren,O. B9, R2, T5	5.75
Weirton,W.Va. W6	5.75
Worcester,Mass. A7	6.60
Youngstown C8, Y1	5.75

STRIP, Cold-Rolled Alloy

Boston T6	12.80
Carnegie,Pa. S18	12.45
Cleveland A7	12.45
Dover,O. G6	12.45
Fontana,Calif. K1	14.55
FranklinPark,Ill. T6	12.45
Harrison,N.J. C18	12.45
Pawtucket,R.I. N8	12.80
Sharon,Pa. S3	12.45
Worcester,Mass. A7	12.75
Youngstown C8	12.90

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7, J5	8.60
Dearborn,Mich. D3	8.70
Dover,O. G6	8.80
Ecorse,Mich. G5	8.70
Ind.Harbor,Ind. Y1	8.60
Lackawanna,N.Y. B2	8.425

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	5.75	8.35	9.30	11.45	14.15
Boston T6	6.30	8.35	9.30	11.45	14.15
Bristol,Conn. W1	...	...	9.30	11.45	...
Carnegie,Pa. S18	...	8.05	9.00	11.15	13.85
Cleveland A7	5.75	8.05	9.00	11.15	13.85
Cleveland C7	...	8.05	9.00	11.15	13.85
Dearborn,Mich. D3	5.85	8.25	9.20	...	...
Detroit D2	5.85	8.25	9.20	10.95	...
Dover,O. G6	5.85	8.05	9.00	11.15	13.85
FranklinPark,Ill. T6	5.85	8.05	9.00	11.15	13.85
Harrison,N.J. C18	...	...	9.30	11.45	14.15
Indianapolis C8	6.00	8.30	9.00	11.15	13.85
NewBritain,Conn.(16) S15	5.75	8.05	9.00	11.15	13.85
NewCastle,Pa. B4	5.75	8.05	9.00	11.15	...
NewCastle,Pa. E5	5.75	8.05	9.00	11.15	13.85
NewHaven,Conn. D2	6.20	8.35	9.30	11.25	...
NewKensington,Pa. A6	5.75	8.05	9.00	11.15	...
NewYork W3	...	8.35	9.30	11.45	14.15
Pawtucket,R.I. N8	6.30	8.35	9.30	11.45	14.15
Riverdale,Ill. A1	5.85	8.05	9.00	11.15	13.85
Rome,N.Y.(33) R6	5.75	8.05	9.00	10.95	13.25
Sharon,Pa. S3	5.75	8.05	9.00	11.15	13.85
Trenton,N.J. R5	...	8.35	9.30	11.45	14.15
Wallingford,Conn. W2	6.20	8.35	9.30	11.45	14.15
Warren,O. T5	5.75	8.05	9.00	11.15	13.85
Weirton,W.Va. W6	5.75	8.05	9.00	11.15	13.85
Worcester,Mass. A7, T6	6.60	8.35	9.30	11.45	14.15
Youngstown C8	5.85	8.05	9.00	11.15	13.85

Spring Steel (Tempered)

Bristol,Conn. W1	...	...	12.90	15.60	...
Buffalo W12	...	...	12.90	...	...
FranklinPark,Ill. T6	...	...	13.40	16.10	19.50
Harrison,N.J. C18	...	...	12.90	15.60	19.00
NewYork W3	...	...	12.90	15.60	19.00
Trenton,N.J. R5	...	...	12.90	15.60	19.00
Worcester,Mass. A7, T6	...	...	12.90	15.60	19.00
Worcester,Mass. W12	...	...	12.90	...	...
Youngstown C8	...	...	13.25	15.95	19.35

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric Motor		Dynamo
BeechBottom,W.Va. W10	....	....	....	9.10	10.10 11.00
Brackenridge,Pa. A4	....	....	....	9.10	10.10 11.00
Mansfield,O. E6	8.025	8.50	9.10	10.10	11.00
Newport,Ky. N9	8.025	8.50	9.10	10.10	11.00
Niles,O. N12	8.025	8.50	9.10	10.10	....
Vandergrift,Pa. U5	....	8.50	9.10	10.10	11.00
Warren,O. R2	8.025	8.50	9.10	10.10	11.00
Zanesville,O. A10	....	8.50	9.10	10.10	11.00

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½¢ lower)	Field	Armature	Electric Motor		Dynamo
Brackenridge,Pa. A4	....	....	9.85	10.85	11.75
GraniteCity,Ill. G4	8.425*	8.95*	9.55*	10.55*	....
IndianaHarbor,Ind. I-2	8.225	8.75*	9.35*	....	....
Vandergrift,Pa. U5	....	9.25†	9.85†	10.85†	11.75†
Vandergrift,Pa. U5	8.225*	8.75*	9.35*	10.35*	11.25*
Warren,O. R2	8.225†	9.25	9.85	10.85	11.75
Zanesville,O. A10	....	9.25	9.85	10.85	11.75

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	11.95	12.50	13.00	14.00
Brackenridge,Pa. A4	11.95	....	....	....
Newport,Ky. N9	11.95	....	....	....
Vandergrift,Pa. U5	11.95	12.50	13.00	14.00
Zanesville,O. A10	11.95‡	12.50‡	13.00‡	14.00‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	15.00	16.60	17.10	....
Butler,Pa. A10	....	....	16.60	17.10	....
Vandergrift,Pa. U5	14.00	15.00	16.60	17.10	12.70
Warren,O. R2	....	....	....	....	12.70‡

* Semiprocessed. † Fully processed only. ‡ Coils annealed; semiprocessed ½c lower. ‖ Coils, ¾-cent higher.

STRIP, Cold-Rolled Ingot Iron	
Warren,O. R2	6.35

STRIP, Electrogalvanized

Cleveland A7	5.75*
Dover,O. G6	5.75*
Riverdale,Ill. A1	5.85*
Youngstown C8	5.75*
Warren,O. B9, T5	5.75*
Weirton,W.Va. W6	5.75*
Worcester,Mass. A7	6.60*

*Plus galvanizing extras.

Strip, Galvanized (Continuous)

Sharon,Pa. S3	6.15
Warren,O. B9	6.15

TIGHT COOPERAGE HOOP

Atlanta A11	4.775
Riverdale,Ill. A1	4.625
Sharon,Pa. S3	4.475
Youngstown U5	4.475

Pittsburgh J5	8.60
Sharon,Pa. S3	8.60
SparrowsPoint,Md. B2	8.425
Warren,O. R2	8.60
Weirton,W.Va. W6	8.60
Youngstown Y1	8.60

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.50	$7.75	$8.15
Fairfield,Ala. T2	7.60	7.85	8.25
FairlessHills,Pa. U5	7.60	7.85	8.25
Gary,Ind. U5	7.50	7.75	8.15
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.50	7.75	8.15
Irvin,Pa. U5	7.50	7.75	8.15
Niles,O. R2	7.50	7.75	8.15
Pittsburg,Calif. C11	8.25	8.50	8.90
SparrowsPoint,Md. B2	7.60	7.85	8.25
Weirton,W.Va. W6	7.50	7.75	8.15
Yorkville,O. W10	7.50	7.75	8.15

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.175	....	....
Niles,O. R2	6.175	6.375	6.675

TINPLATE,American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.80	$9.05
Fairfield,Ala. T2	8.90	9.15
Fairless,Pa. U5	8.90	9.15
Gary,Ind. U5	8.80	9.05
Ind.Har. I-2, Y1	8.80	9.05
Irvin,Pa. U5	8.80	9.05
Pitts.Cal. C11	9.55	9.80
Sp.Pt.,Md. B2	8.90	9.15
Warren,O. R2	8.00	9.05
Weirton,W.Va. W6	8.80	9.05
Yorkville,O. W10	8.80	9.05

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.60
Fairfield,Ala. T2	6.70
FairlessHills,Pa. U5	6.70
Gary,Ind. U5	6.60
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.60
Irwin,Pa. U5	6.60
Niles,O. R2	6.60
Pittsburg,Calif. C11	7.35
SparrowsPoint,Md. B2	6.70
Warren,O. R2	6.60

Weirton,W.Va. W6	6.60
Yorkville,O. W10	6.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	6.20
Gary,Ind. U5	6.20
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.20
Irvin,Pa. U5	6.20
Yorkville,O. W10	6.20

MANUFACTURING TERNES (Special Coated; Base Box)

Gary,Ind. U5	$7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Light Coated, 4 lb; Base Box)

Yorkville,O. W10	$8.75

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.85

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R3	5.75
Aliquippa,Pa. J5	5.75
Alton,Ill. L1	5.925
Atlanta A11	5.95
Bartonville,Ill. K4	5.85
Buffalo W12	5.75
Chicago W13	5.75
Cleveland A7, C20	5.75
Crawfordsville,Ind. M8	5.85
Donora,Pa. A7	5.75
Duluth,Minn. A7	5.75
Fairfield,Ala. T2	5.75
Fostoria,O.(24) S1	5.95
Houston S5	6.00
Jacksonville,Fla. M8	6.27
Johnstown,Pa. B2	5.75
Joliet,Ill. A7	5.75
KansasCity,Mo. S5	6.00
Kokomo,Ind. C16	5.85
LosAngeles B3	6.70
Minnequa,Colo. C10	6.00
Monessen,Pa. P7	5.75
Newark 6-8 ga. I-1	6.40
No.Tonawanda B11	5.75
Palmer,Mass. W12	6.00
Pittsburg,Calif. C11	6.70
Portsmouth,O. P12	5.75
Rankin,Pa. A7	5.75
So.Chicago,Ill. R2	5.75
So.SanFrancisco C10	6.70
SparrowsPoint,Md. B2	5.85
Sterling,Ill.(1) N15	5.75
Sterling,Ill. N15	5.85
Struthers,O. Y1	5.75
Waukegan,Ill. A7	5.75
Worcester,Mass. A7	6.05

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.375
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Cleveland A7	7.20
Donora,Pa. A7	7.20
Duluth,Minn. A7	7.20
Fostoria,O. S1	7.20
Johnstown,Pa. B2	7.20
LosAngeles B3	8.15
Milbury,Mass.(12) N6	7.50
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
Muncie,Ind. I-7	7.40
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Roebling,N.J. R5	7.50
So.Chicago,Ill. R2	7.20
So.SanFrancisco C10	8.15
SparrowsPt.,Md. B2	7.30
Struthers,O. Y1	7.20
Trenton,N.J. A7	7.50
Waukegan,Ill. A7	7.20
Worcester A7,J4,T6,W12	7.50

WIRE, Upholstery Spring

Aliquippa,Pa. J5	6.90
Alton,Ill. L1	7.075
Buffalo W12	6.90
Cleveland A7	6.90
Donora,Pa. A7	6.90
Duluth,Minn. A7	6.90
Johnstown,Pa. B2	6.90
KansasCity,Mo. S5	7.50
LosAngeles B3	7.85
Minnequa,Colo. C10	7.075
Monessen,Pa. P7, P16	6.90
NewHaven,Conn. A7	7.20
Palmer,Mass. W12	7.20
Pittsburg,Calif. C11	7.85
Portsmouth,O. P12	6.90
Roebling,N.J. R5	7.20
So.Chicago,Ill. R2	6.90
So.SanFrancisco C10	7.85
SparrowsPoint,Md. B2	7.00
Struthers,O. Y1	6.90
Trenton,N.J. A7	7.20
Waukegan,Ill. A7	6.90
Worcester,Mass. A7	7.20

WIRE, Fine & Weaving(6" Coils)

Alton,Ill. L1	11.375
Bartonville,Ill. K4	11.30
Buffalo W12	11.20
Chicago W13	11.20
Cleveland A7	11.20
Crawfordsville,Ind. M8	11.30
Fostoria,O. S1	11.20
Jacksonville,Fla. M8	11.73
Johnstown,Pa. B2	11.20
Kokomo,Ind. C16	11.20
Minnequa,Colo. C10	10.95
Monessen,Pa. P16	11.20
Muncie,Ind. I-7	11.40
Palmer,Mass. W12	11.50
Roebling,N.J. R5	11.50
So.SanFrancisco C10	11.55
Waukegan,Ill. A7	11.20
Worcester,Mass. A7,T6	11.50

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	9.90
Buffalo W12	9.90
Johnstown,Pa. B2	9.90
Minnequa,Colo. C10	10.025
Monessen,Pa. P16	9.90
Muncie,Ind. I-7	10.10
Portsmouth,O. P12	9.90
Roebling,N.J. R5	10.20
SparrowsPt.,Md. B2	10.00

ROPE WIRE	(A)
Alton,Ill. L1	9.75
Bartonville,Ill. K4	9.75
Buffalo W12	9.75
Fostoria,O. S1	9.75
Johnstown,Pa. B2	9.75
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.90
Palmer,Mass. W12	10.05
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Worcester J4, T6	9.65

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE

(Continued)

WIRE, Tire Bead

Alton,Ill. L1	13.25
Bartonville,Ill. K4	13.25
Monessen,Pa. P16	13.15
Portsmouth,O. P12	13.15
Roebling, N.J. R5	13.45

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	7.95
Baltimore T6	8.25
Buffalo W12	7.95
Cleveland A7	7.95
Crawfordsville,Ind. M8	8.05
Dover,O. G6	7.95
Fostoria,O. S1	7.95
FranklinPark,Ill. T6	8.05
Kokomo,Ind. C16	8.05
Massillon,O. R5	7.95
Milwaukee C23	8.15
Monessen,Pa. P7, P16	7.95
Pawtucket,R.I. N8	8.25
Rome,N.Y.(32) R6	7.95
Trenton,N.J. R5	8.25
Worcester A7, T6, W12	8.25

WIRE, Merchant Quality (6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	6.90 7.30**
Aliquippa J5	6.90 7.425†
Atlanta A11	7.00 7.55
Bartonville(48) K4	7.00 7.55
Buffalo W12	6.90 7.30†
Cleveland A7	6.90
Crawfordsville M8	7.00 7.55
Donora,Pa. A7	6.90 7.30†
Duluth,Minn. A7	6.90 7.30†
Fairfield T2	6.90 7.30†
Houston,Tex. S5	7.15 7.55†
Jacks'ville,Fla. M8	7.425 7.95
JohnstownB2(48).	6.90 7.45*
Joliet,Ill. A7	6.90 7.30†
KansasCity,Mo. S5	7.15 7.55†
Kokomo C16	7.00 7.40†
LosAngeles B3	7.85
Minnequa C10	7.15 7.55**
Monessen P7 (48)	6.90 7.45
Palmer W12	7.20 7.60†
Pitts.,Calif. C11	7.85 8.25†
Portsmouth,O. P12	6.90
Rankin A7	6.90 7.30†
So.Chicago R2	6.90 7.30**
S.S.Fran. C10	7.85 8.25**
SparrwsPt.B2(48).	7.00 7.55*
Sterling(1)(48)N15	6.90 7.45
Struthers,O.(48)Y1	6.90 7.40†
Worcester A7	7.20

*Based on 11c zinc; †5c zinc; ‡Less than 10c zinc; **Subject to zinc equalization extras.

WOVEN Fence, 9-15½ Ga.

	Col.
Ala.City,Ala. R2	146**
Ala.City, 17 ga. R2	241**
Ala.City, 18 ga. R3	251**
Aliq'ppa,Pa.9-14½ga.J5	149‡
Atlanta A11	151
Bartonville,Ill. K4	151
Crawfordsville,Ind. M8	151
Donora,Pa. A7	146†
Duluth,Minn. A7	146†
Fairfield,Ala. T2	146†
Houston,Tex. S5	151†
Johnstown,Pa.(43) B2	149
Joliet,Ill. A7	146†
KansasCity,Mo. S5	151†
Kokomo,Ind. C16	148‡
Minnequa,Colo. C10	151**
Monessen,Pa. 9 ga. P17,	149
Pittsburg,Calif. C11	169†
Rankin,Pa. A7	146†
So.Chicago,Ill. R2	146**
Sterling,Ill.(1) N15	149

†Based on 5c zinc; *11c zinc; ‡10c zinc; **Subject to zinc equalization extras.

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	155
Atlanta A11	157
Bartonville,Ill. K4	157
Crawfordsville,Ind. M8	157
Donora,Pa. A7	155
Duluth,Minn. A7	156
Fairfield,Ala. T2	155
Joliet,Ill. A7	155
Houston,S5	160
KansasCity,Mo. S5	160
Kokomo,Ind. C16	157
Minnequa,Colo. C10	160
Pittsburg,Calif. C11	179
So.Chicago,Ill. R2	155
So.SanFran.,Calif. C10	179
SparrowsPoint,Md. B2	157
Sterling,Ill.(1) N15	155

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	159**
Aliquippa J5	156‡
Atlanta A11	164
Bartonville,Ill. K4	164
Crawfordsville,Ind. M8	164
Donora,Pa. A7	159†
Duluth,Minn. A7	159†
Fairfield,Ala. T2	159†
Houston,Tex. S5	164‡
Johnstown,Pa. B2	162*
Joliet,Ill. A7	159†
KansasCity,Mo. S5	164‡
Kokomo,Ind. C16	161†
Minnequa,Colo. C10	164**
Monessen,Pa. P7	162
Pittsburg,Calif. C11	179†
Rankin,Pa. A7	159†
So.Chicago,Ill. R2	159**
S.SanFrancisco C10	179**
SparrowsPoint,Md. B2	164*
Sterling,Ill.(1) N15	162

†Based on 5c zinc; *11c zinc; ‡10c zinc; **Subject to zinc equalization extras.

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City R2	13.15	14.70**
Bartonville K4	13.25	15.10
Buffalo W12	13.15	
Cleveland A7	13.15	
Crawfrdsville M8	13.25	15.10
Fostoria,O. S1	13.25	14.80†
Johnstown B2	13.15	15.00*
Kokomo C16	13.25	14.80†
Minnequa C10	13.40	15.10**
Palmer,Mas.W12	13.15	14.70†
Pitts.,Calif. C11	13.50	15.05†
So.Chicago R2	13.15	14.70
SparrowsPt. B2	13.25	15.10*
Sterling(1) N15	13.15	15.00
Waukegan A7	13.15	14.70†
Worcester A7	13.45	

*Based on 11c zinc; †5c zinc; ‡10c zinc; **Subject to zinc equalization extras.

NAILS, Stock
To dealers & mfrs. (7)

	Col.
AlabamaCity,Ala. R2	137
Aliquippa,Pa. J5	137
Atlanta A11	139
Bartonville,Ill. K4	139
Chicago,Ill. W12	137
Cleveland A9	142
Crawfordsville,Ind. M8	139
Donora,Pa. A7	137
Duluth,Minn. A7	137
Fairfield,Ala. T2	137
Galveston,Tex. D7	139
Houston, Tex. S5	142
Johnstown,Pa. B2	137
Joliet,Ill. A7	137
KansasCity,Mo. S5	142
Kokomo,Ind. C16	139
Minnequa,Colo. C10	142
Monessen,Pa. P7	137
Pittsburg,Calif. C11	156
Rankin,Pa. A7	137
So.Chicago,Ill. R2	137
SparrowsPt.,Md. B2	139
Sterling,Ill.(1) N15	137
Worcester,Mass. A7	143

NAILS, CUT (100 lb keg)
To dealers (33)

Conshohocken,Pa. A3	$8.30
Wheeling,W.Va. W10	8.30

STAPLES, Polished Stock
To dealers & mfrs. (7)

	Col.
Aliquippa,Pa. J5	138
Atlanta A11	140
Bartonville,Ill. K4	139
Crawfordsville,Ind. M8	139
Donora,Pa. A7	138
Duluth,Minn. A7	138
Fairfield,Ala. T2	138
Johnstown,Pa. B2	138
Joliet,Ill. A7	138
Kokomo,Ind. C16	139
Minnequa,Colo. C10	142
Monessen,Pa. P7	137
Pittsburg,Calif. C11	157
Rankin,Pa. A7	138
SparrowsPt. Md. B2	140
Sterling,Ill.(1) N15	137
Worcester,Mass. A7	144

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2, I-2	150
Duluth,Minn. A7	150
Franklin,Pa. F5	150
Johnstown,Pa. B2	150
Marion,O. F11	150
Minnequa,Colo. C10	155
Moline,Ill. R2	155
So.Chicago,Ill. R2	150
Tonawanda,N.Y. B12	150
Williamsport,Pa. S19	150

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(Base discounts, per cent off list, f.o.b. midwestern plants)

4 in. and shorter:	
½-in. & smaller diam	2
Over 4 in. through 6 in.:	
½ in. & smaller diam	+3
6 in. and shorter:	
⅝-in. and ¾-in.	+4
⅞ in. and larger	+6
Longer than 6 in.:	
All diameters	+15
Lag bolts, all diams.:	
6 in. and shorter	6
Over 6 in. long	+2
Ribbed Necked Carriage	+4
Blank	10
Plow	23
Step, Elevator, Tap and Sleigh Shoes	10
Tire Bolts	+3
Boiler & Fitting-Up Bolts	21

NUTS

H.P. and C.P., regular & heavy:	
Square, all sizes	55
H.P., Hex, regular & heavy:	
¾" and smaller	55
⅞" to 1⅛", inclusive	58
1¼" to 1½", inclusive	60
1⅝" and larger	55
C.P. Hex regular & heavy:	
All sizes	56
Hot Galv. Nuts (all types):	
¾" or smaller	38
⅞" to 1½", inclusive	41
Finished Hex Nuts:	
New standard, all sizes	56
Semifinished & Slotted Hex:	
Regular and heavy, all sizes	55

SQUARE HEAD SET SCREWS

(1035 steel; packaged; per cent off list)

1 in. diam. x 6 in. and shorter	34
1 in. and smaller diam. x over 6 in.	20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	34
¼ in. diam. & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	43
Plated finishes	23

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
¼ in. through ⅝-in.	38
¾-in. through 1 in.	15
Longer than 6 in.:	
¼-in. through ⅝-in.	20
¾-in. through 1 in.	7

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.25
7/16-in. under. .List less 37%

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	19.59	19.00
1¼	13	....	23.21	18.77
1½	13	21.40	25.65	20.75
1¾	13	25.28	30.31	24.53
2	13	28.33	33.97	27.48
2¼	13	31.91	38.26	30.95
2¼	12	34.68	41.52	33.59
2½	12	38.15	45.74	37.00
2¾	12	41.31	49.53	40.07
3	12	44.05	52.82	42.72

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Standard All No. 2	Too Soft 60 lb Under
RAILS				
Bessemer, Pa. U5	4.45	4.35	4.40	5.35
Ensley,Ala. T2	4.45	4.35	...	5.35
Fairfield,Ala. T2	...	...	...	5.35
Gary,Ind. U5	4.45	4.35	4.40	...
IndianaHarbor,Ind. I-2	4.45	4.35	4.40	...
Johnstown,Pa. B2	...	...	...	(16)5.35
Lackawanna,N.Y. B2	4.45	4.35	...	5.35
Minnequa,Colo. C10	4.45	4.35	...	5.85
Steelton,Pa. B2	4.45	4.35	...	5.35
Williamsport,Pa. S10	...	...	...	5.35

TIE PLATES

Fairfield,Ala. T2	5.275
Gary,Ind. U5	5.275
Ind.Harbor,Ind. I-2	5.275
Lackawanna,N.Y. B2	5.275
Minnequa,Colo. C10	5.275
Seattle B3	5.425
Steelton,Pa. B2	5.275
Torrance,Calif. C11	5.425

TRACK BOLTS (20) Treated

Cleveland R2	11.50
KansasCity,Mo. S5	11.50
Lebanon,Pa. B2	11.50
Minnequa,Colo. C10	11.50
Pittsburgh O3, P14	11.50
Seattle B3	12.00

AXLES

Ind.Harbor,Ind. S13	6.75
Johnstown,Pa. B2	6.75

JOINT BARS

Bessemer,Pa. U5	5.425
Fairfield,Ala. T2	5.425
Ind.Harbor,Ind. I-2	5.425
Joliet,Ill. U5	5.425
Lackawanna,N.Y. B2	5.425
Minnequa,Colo. C10	5.425
Steelton,Pa. B2	5.425

SCREW SPIKES

Cleveland R2	11.00

STANDARD TRACK SPIKES

Fairfield,Ala. T2	7.30
Ind.Harbor,Ind. I-2, Y1	7.30
KansasCity,Mo. S5	7.30
Lebanon,Pa. B2	7.30
Minnequa,Colo. C10	7.30
Pittsburgh J5	7.30
Seattle B3	7.80
So.Chicago,Ill. R2	7.30
Struthers,O. Y1	7.30
Youngstown R2	7.30

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron:	
98+% Fe, annealed, c.l.	15.25
Unannealed:	
Minus 100 mesh	11.75
Minus 35 mesh	9.25
Minus 20 mesh	9.00
Swedish, c.l.f. N.Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N. J., in bags	9.50
Electrolytic iron:	
Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
97.9-99.8% size 5 to 10 microns—83.00-148.00	
Aluminum:	
Atomized, 500 lb drums, frght. allowed:	
Carlots	30.00
Ton lots	33.00
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	29.75-37.25†
Bronze, 5000-lb lots	48.75-52.00†
Copper:	
Electrolytic	13.75*
Reduced	13.75*
Lead	7.50*
Manganese:	
Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	94.00
Nickel-Silver, 5000-lb lots	45.50‡
Nickel-Silver, 5000-lb lots	49.00**
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	43.50
Solder	7.00*
Stainless Steel, 302	91.00
Tin	14.50*
Zinc, 5000-lb lots	17.25-31.00‡
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.95
Less than 1000 lb	5.10
Chromium, electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛" to 1 7/16"; 1 7/16" to 1 15/16" 4.75c; 1 15/16" to 7 5/16" 5.15c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.143 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 4.95c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon, add 0.40c for alloy and 0.35c H.S.-L.A.
(31) Widths over ⅝-in.; 6.40c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 gage & heavier; 60" & narrower.
(38) 14 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. to mill zone or within switching limits, 5.10c.
(43) 9-14½ gage.
(48) 6-7 gage.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		56.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5
Ambridge, Pa. N2	13.5	..	17.5	....	20	....	21.5	....	21.5	....	20.75	....	23.25	....
Lorain, O. N3	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5
Youngstown Y1	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Alton, Ill. L1	....	....	....	....	....	....	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Benwood, W. Va. W10	24	+4.5	15.25	+10.25	7.25	+17.25	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Butler, Pa. F6	25	+3.5	17	+ 8.5	9.5	+15	....	..	....	....	....	..	....	....
Etna, Pa. N2	....	....	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Fairless Hills, Pa. N3	....	....	....	....	....	....	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Fontana, Calif. K1	....	....	....	....	....	....	10.75	+6.5	13.75	+2.5	16.25	1	18.75	2.25
Ind. Harbor, Ind Y1	....	....	....	....	....	....	22.75	5.5	25.75	9.5	28.25	13	30.75	14.25
Lorain, O. N3	....	....	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sharon, Pa. S4	25	+3.5	17	+ 8.5	9.5	+15	....	..	....	....	....	..	....	....
Sharon, Pa. M6	....	....	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sparrows Pt., Md. B2	23	+5.5	15	+10.5	7.5	+17	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Youngstown R2, Y1	....	....	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Wheatland, Pa. W9	23	+5.5	15	+10.5	7.5	+17	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.65		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	....	....	....
Alton, Ill. L1	30.25	14.25	30.75	14.75	32.25	15	32.25	15	....	....	....	....
Benwood, W. Va. W10	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Etna, Pa. N2	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Fairless Hills, Pa. N3	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Fontana, Calif. K1	19.25	3.25	19.75	3.75	21.25	4	21.25	4	12.5	+3.25	12.5	+5.25
Ind. Harbor, Ind. Y1	31.25	15.25	31.75	15.75	33.25	16	33.25	16	24.5	6.75	25.5	6.75
Lorain, O. N3	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	....	....	....
Sharon, Pa. M6	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	....	....	....
Sparrows Pt., Md. B2	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Youngstown R2, Y1	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Wheatland, Pa. W9	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75

*Galvanized pipe discounts based on current price of zinc (11.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. Bars; H.R. Strip	Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.75	21.00	30.00	34.75	30.25	35.75	37.75	41.75	38.75
302	17.75	23.25	30.25	35.00	32.50	36.00	38.00	42.00	42.00
302B	19.00	25.00	31.00	35.00	35.50	36.00	38.00	45.25	45.25
303	....	25.25	32.75	37.75	....	38.75	40.25	46.00	46.00
304	19.00	24.50	31.75	36.75	35.00	38.00	40.50	44.50	44.50
304L	....	....	36.75	41.75	40.00	43.00	45.50	49.50	49.50
305	20.50	26.50	33.50	37.25	38.00	38.00	41.00	47.50	47.50
308	20.75	27.25	36.25	41.75	39.00	43.00	47.00	49.00	49.00
309	27.75	36.00	44.00	50.50	50.50	51.75	55.00	63.25	63.25
309S	29.75	38.75	48.00	55.75	55.25	56.75	60.25	69.75	69.75
310	35.00	45.25	58.75	68.25	64.75	69.50	71.00	74.25	74.25
314	....	....	....	....	....	....	71.00	....	....
316	29.75	38.00	49.25	56.25	55.00	57.25	60.50	64.50	64.50
316L	....	....	53.25	61.25	60.00	62.25	65.50	69.50	69.50
317	25.00	45.50	59.25	68.75	69.50	70.25	72.75	79.00	79.00
321	23.50	30.25	36.00	41.50	41.75	42.75	46.50	51.25	51.25
330	....	....	61.50	....	....	72.00	73.25	81.25	81.25
18-8CbTa	29.25	38.25	46.00	52.25	53.00	53.75	58.50	66.50	66.50
403	....	....	27.00	30.75	....	32.00	34.25	....	....
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	39.75	39.75
410	14.00	18.25	24.00	27.25	26.26	28.75	30.00	34.25	34.25
414	....	....	24.50	....	....	29.25	30.50	35.25	35.25
416	....	....	24.50	28.25	....	29.25	....	....	....
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	52.75	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	34.75	34.75
430F	....	....	25.00	28.75	....	29.75	....	....	....
431	15.00	19.25	25.00	28.75	28.00	29.75	....	35.75	35.75
446	....	....	33.50	38.25	50.25	39.50	40.75	59.75	59.75

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
Stainless:			
302	....	....	28.00
304	28.30	33.60	29.75
304-L	30.30	35.50	....
310	41.30	47.00	....
316	33.40	38.80	42.75
316-L	37.80	43.30	....
316-CB	36.90	45.50	....
321	30.00	35.30	34.25
347	32.20	38.60	44.25
405	23.90	31.10	....
410	23.40	30.60	....
430	23.40	30.60	24.25
Inconel	47.90	63.90	....
Nickel	39.50	54.10	....
Monel	40.80	54.80	....
L-Nickel	41.70	58.50	....
Copper*	....	....	46.00

	Strip, Carbon Base: Cold-Rolled 10%	Cold-Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Copper*	29.60	37.15	25.75	33.55

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.26	5% Cr Hot Work	0.405
Extra Carbon	0.31-.315	W-Cr Hot Work	0.425
Special Carbon	0.37	V-Cr Hot Work	0.445
Oil Hardening	0.405	Hi-Carbon-Cr	0.73

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.030
18.25	4.25	1	4.75	....	2.245-2.415
18	4	2	9	....	2.615
18	4	2	....	....	1.705
18	4	1	....	....	1.540
14	4	2	5	....	2.185
13.75	3.75	2	5	....	2.185
13.5	4	3	....	....	1.805
9	3.5	..	....	....	1.115
6	4	2	....	5	1.045
6	4	3	....	6	1.290
1.5	4	1	....	8.5	0.900

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity,Ala. R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	56.50†	....
Gadsden,Ala. R2	52.38	52.88	....	....
Cincinnati, deld.	....	60.58	....	....
Buffalo District				
Buffalo H1, R2	56.00	56.50	57.00	57.50
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No.Tonawanda,N.Y. T9	....	56.50	57.00	57.50
Boston, deld.	66.65	67.15	67.65	....
Rochester,N.Y., deld.	59.02	59.52	60.02	....
Syracuse,N.Y., deld.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Chicago R2	56.00	....	56.50	....
Gary,Ind. U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14, Y1	56.00	56.50	56.50	....
So.Chicago,Ill. U5	56.00	....	56.50	57.00
Milwaukee,deld.	58.17	58.67	58.67	59.17
Muskegon,Mich., deld.	....	62.80	62.80	....
Cleveland District				
Cleveland A7, R2	56.00	56.50	56.50	57.00
Akron,O. deld.	58.75	59.25	59.25	59.75
Lorain,O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem,Pa. B2	58.00	58.50	59.00	59.50
NewYork, deld.	....	62.28	62.78	....
Newark, deld.	61.02	61.52	62.02	62.52
Birdsboro,Pa. B10	58.00	58.50	....	....
Chester,Pa. C31	....	48.50	49.00	....
Philadelphia, deld.	....	50.16	50.66	....
Steelton,Pa. B2	58.00	58.50	59.00	59.50
Swedeland,Pa. A2	58.00	58.50	59.00	59.50
Philadelphia, deld.	59.66	60.16	60.66	61.16
Troy,N.Y. R2	58.00	58.50	59.00	59.50
Pittsburgh District				
NevilleIsland,Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	57.87	57.87	58.37
McKeesRocks, deld.	....	57.54	57.54	58.04
Lawrenceville,Homestead, Wilmerding,Monaca, deld.	....	58.16	58.16	58.66
Verona,Trafford, deld.	58.19	58.69	58.69	59.19
Brackenridge, deld.	58.45	58.95	58.95	59.45
Bessemer,Pa. U5	56.00	....	56.50	57.00
Clairton,Rankin,SoDuquesne,Pa. U5	56.00	....	....	....
McKeesport,Pa. N3	56.00	....	....	57.00
Midland,Pa. C18	56.00	....	....	....

	Basic	No. 2 Foundry	Malleable	Bessemer
Youngstown District				
Hubbard,O. Y1	....	....	56.50	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield,O. deld.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass. E1	60.50	61.00	61.50	....
Fontana,Calif. K1	62.00	62.50	....	....
Geneva,Utah C11	56.00	56.50	....	....
GraniteCity,Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
LoneStar,Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	58.00	59.00	59.00	....
Rockwood,Tenn. T2	....	52.50*	56.50	....
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, deld.	61.76	62.26	....	....

*Low phos, southern grade. †Phos, 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si. 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	$65.00
Buffalo H1	66.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50 Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$80.50
Keokuk,Iowa, (Open-hearth & Fdry, freight allowed K2	85.00
Keokuk, O.H. & Fdry, 12¼ lb piglets, 16% Si, frgt allowed K2	88.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland A7 (Intermediate)	$61.00
Lyles,Tenn. T3	70.00
Rockwood,Tenn. T3	70.00
Steelton,Pa. B2	64.00
Philadelphia, deld.	67.55
Troy,N.Y. R2	64.00

Warehouse Steel Products

Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except Birmingham and St. Paul, 15 cents; Philadelphia, New York, Boston and Los Angeles, 10 cents; Buffalo, 25 cents on C.R. and galvanized sheets, C.F. and alloy bars and 20 cents on other commodities; Houston, Seattle, Spokane, Wash., no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302‡§	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.9	H.R. Alloy 4140††		Carbon	Floor
Baltimore	6.02	7.51	7.79	....	6.89	...	6.68	8.52¶	12.54	6.72	6.37	7.76
Birmingham	6.35	7.35	8.25‡	....	6.60	...	6.50	9.10	....	6.65	6.65	8.45
Boston	7.23	8.23	9.52	45.25¶	7.47	...	7.20	8.60	12.30	7.49	7.37	8.50
Buffalo	6.35	7.40	8.79	....	6.70	...	6.50	7.85	12.00	6.72	6.65	7.90
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.38	7.38	8.30	46.05	6.62	...	6.51	7.50	11.75	6.69	6.52	7.64
Cincinnati	6.49	7.37	8.30	46.10	6.86	...	6.75	7.80	12.00	6.86	6.81	7.89
Cleveland	6.38	7.38	8.25	46.16	6.72	...	6.57	7.60	11.81	7.02	6.69	7.81
Detroit	6.57	7.57	8.58	43.50	6.90	7.36	6.79	7.79	11.95	7.16	6.80	7.83
Erie, Pa.	6.35	7.38	8.30	....	6.70	...	6.50	7.45¶	....	6.69	6.52	7.64
Houston	7.35	7.80	9.93	....	7.70	9.30	7.70	9.50	....	7.60	7.35	8.75
Los Angeles	7.50	9.35	9.95	50.15	7.85	11.75	7.45	10.15	13.15	7.65	7.45	9.55
Milwaukee	6.47	7.47	8.39	....	6.71	...	6.60	7.69	11.84	6.86	6.61	7.73
Moline, Ill.	6.73	7.73	8.65	....	6.97	...	6.86	7.85	....	7.04	6.87	...
New York	6.97	7.91	8.79	44.95	7.56	...	7.37	8.73¶	12.13	7.38	7.27	8.68
Norfolk, Va.	7.00	...	...	....	7.10	...	7.10	8.60	....	7.10	7.10	7.95
Philadelphia	6.19	7.44	8.26	41.95¶	6.96	8.80	6.74	8.36¶	11.96	6.54	6.49	7.51**
Pittsburgh	6.38	7.38	8.30	46.00	6.72	...	6.51	7.85	11.75	6.69	6.52	7.64
Portland, Oreg.	7.20	8.25	8.90	48.50	7.45	...	7.30	10.45	14.00	7.25	7.05	8.95
Richmond, Va.	6.43	7.39	8.67	....	6.77	...	6.71	8.33	....	7.08	6.65	8.08
St. Louis	6.67	7.67	8.59	43.89	6.91	...	6.80	7.89	12.04	7.09	6.81	7.93
St. Paul	7.04	8.04	8.96	....	7.28	...	7.17	8.26	....	7.35	7.18	8.30
San Francisco	7.55	8.95	8.70	51.65	7.80	...	7.35	10.05	13.05	7.50	7.40	9.45
Seattle	8.10	9.80	10.15	51.00	8.20	...	7.80	10.95	13.50	7.75	7.80	9.60
Spokane	8.25	9.65†	10.05	....	7.80	...	7.80	10.85‡‡	14.25	7.45	7.55	9.60
Washington	6.70	7.99	7.97	....	7.37	...	7.38	9.09	....	7.31	7.05	8.16

*Prices do not include gage extras; †prices include gage and coating extras, based on 11-cent zinc except in New York, Philadelphia, Los Angeles, Cincinnati, Cleveland, Pittsburgh, San Francisco (11.50-cent zinc) and in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extra; §as rolled; **⅛-in. and heavier; ††as annealed; ‡‡prices include $2 for crating; §§under ¼-in.

Base quantities, 2000 to 4999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb; stainless sheets, 5000 lb except in New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; 9—500 to 9999 lb; 6—4000 lb and over; 8—1000 to 1999 lb; 6—1000 lb and over; 7—1500 to 3999 lb; ¶—f.o.b. local delivery in lots of 10,000 lb and over.

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(engineering bulletin #11)

insures carbon specifications

RECARB-X is ideal for off-carbon heats. A fifty pound bag per 100-tons of steel will raise carbon two points when added to the ladle. RECARB-X dissolves quietly, gives uniform, dependable carbon recovery at all carbon levels. There are grades of RECARB-X for the furnace charge.

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(engineering bulletin #15)

for better ingot surfaces

For as little as ¼c per ingot ton, you can insure quicker, easier mold stripping with MEXICAN Ingot Mold Washes. MEX and 90-B can be applied at any temperature and are easy to prepare and use. Where a high volatile "gas kick" is needed, VOLMEX or XF-81 will supply the answer. For an inert, non-carbonaceous mineral coating, XF-88 will do the job.

MEXATOP®

(engineering bulletin #5)

gives sounder ingots

MEXATOP is a powder compound which spreads easily over molten ingot heads and casting risers. A ⅜" layer over the molten surface works effectively to prevent cavitation and insure sounder castings.

Write for Engineering Bulletins describing these products.

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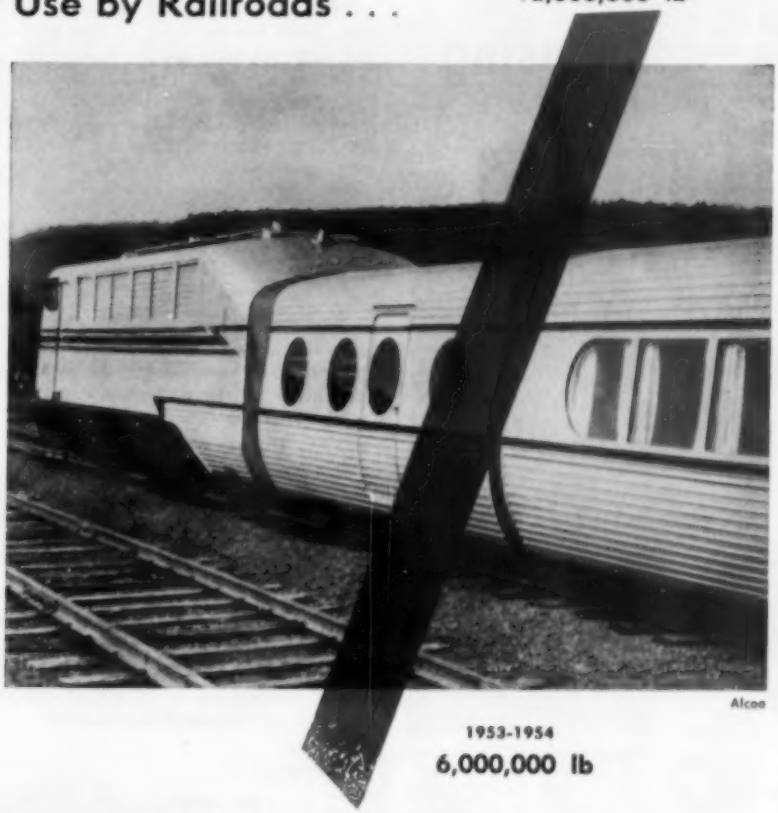
THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION • SAGINAW, MICHIGAN

Growth of Aluminum Use by Railroads . . .



Alcoa

Passenger and freight trains lose weight as . . .

Rails Give Highball to Aluminum

RAILROAD APPLICATIONS of aluminum may be doubled by 1960. Aluminum Co. of America, Pittsburgh, reports that some 6 million lb of aluminum alloys were sold to railroads in both 1953 and 1954. While railroad buying is currently slow, any railroad rebuilding programs will result in sharp increases of aluminum applications, Alcoa says. Five years from now usage should total 12 million lb annually.

A look at present and planned railroad uses of the light metal shows aluminum holds a firm position on railroad drawing boards. "Potential use of aluminum is bright," says G. B. Hauser, head of the railroad section, development division, Alcoa.

Hoppers—Aluminum hopper cars were first produced in 1932. Ten original 70-ton cars built for ore transportation are in service today, together with 64 others. Weight savings from use of aluminum makes possible a heavier cargo. Alcoa says the aluminum car can carry 6 tons more coal than a steel car. Aluminum also resists wear.

Box Cars—First boxcars to use aluminum alloys were built in 1944 for the Great Northern Railroad. Approximately 20 aluminum boxcars recently built are proving themselves in service, Mr. Hauser notes. Railroads prefer to use aluminum cars in special service, so they won't be transferred to other railroads.

Refrigerator Cars—Two aluminum refrigerator cars entered railroad service some six years ago. Advantages of using aluminum include light weight, long car life and low maintenance. After six years of service, aluminum cars have no corrosion problems, Alcoa reports.

Tank Cars—In 1954, more than 1900 aluminum tank cars served American railroads. This represents a sharp increase from the 1949 total of 550. Alcoa points out that aluminum cars can carry such liquids as nitric acid without harm to the metal. Also, aluminum will not harm the chemicals carried. As more chemicals come into use, Alcoa expects further use of aluminum in tank cars.

Locomotives — Aluminum pistons and bearings are now functioning in diesel locomotives. Aluminum engine blocks are a possibility. Mr. Hauser reports some diesels with aluminum cab structure have been shipped to South American roads where light weight is important.

Passenger Cars—Since 1945, more than 590 aluminum passenger cars have been constructed, using about 15,000 lb of the metal in each car body. Also, most passenger cars now use an additional 2000 to 10,000 lb of aluminum for interior trim and finish, Alcoa adds. Undercarriages are steel, as are wheels.

The weight of aluminum used in freight cars averages between 6000 and 8000 lb. Heavy tank cars contain 10,000 lb of aluminum. Alcoa estimates that use of aluminum instead of steel will save about 8000 lb on a typical freight car.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 141 & 142

Strong uptrend continues in sheet demand. This is particularly true of cold-rolled, galvanized and enameling stock. Further gains are reported in hot-rolled sheets also, with deliveries now averaging around five weeks but ranging up to eight. Such specialties as electrical and stainless sheets and strip are moving at a faster clip.

Current sheet mill order backlogs are sufficient to support high-level production schedules over the next three months. At the same time, expectations are inventory building by miscellaneous users will partially offset the usual seasonal sag in automotive demand in the third quarter.

Cold-rolled sheetmakers now have little tonnage to offer before May. Some are virtually sold out for that month, and, in general, deliveries extend about 12 weeks. Underlying extended deliveries are not only heavy automobile requirements, but, notably in the East, expanding needs of household appliance makers and fabricators of light tanks.

The situation in enameling stock reflects active pressure from makers of household appliances. In galvanized, increasing tonnage is being booked for third quarter, although some producers can still accept orders for mid-second quarter, especially those producing noncontinuous hot dipped sheets. Stainless strip bookings are more extended than carbon strip with some New England con-

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TOUGH CORROSION problems *can* be solved, but not by using ordinary maintenance paints or conventional protective coatings. For long-term protection, it takes *specialized* Bitumastic Protective Coatings—the kind that Koppers makes.

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Send for a set of free booklets describing the family of Bitumastic Protective Coatings. At the same time, tell us about *your* corrosion problem so that we can suggest a satisfactory solution. You incur no obligation, of course.

*Hi-Heat Gray is a non-coal-tar vehicle with metallic pigment

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verters, notably the 430 grade for automotive use.

Automakers continue to press Chicago district mills for more steel, particularly cold-rolled sheets. As yet, there are no signs in that market area of any easing in demand, with some mills committed through the first half on cold-rolled, galvanized and enameling sheets. Most St. Louis district mills are booked well into the second quarter, though occasionally openings develop in rolling schedules.

Wire . . .

Wire Prices, Pages 142 & 143

Wiremakers' order volume is increasing. The pickup, described as moderate, is seen as the forerunner of active spring demand. Manufacturers wire bookings lag at some points but are improving at others, such as Pittsburgh and New England. Merchant products trade is definitely on the rise at all producing points.

In New England, consumers of drawn wire are ordering a little more tonnage.

Merchant items are moving noticeably better. Construction requirements are opening up as spring nears and agricultural needs are rising. Peak production of merchant products is still several weeks distant.

Plates . . .

Plate Prices, Page 140

First noticeable in the Far West and Midwest, the pickup in plate demand has spread to the East where mill deliveries are reported lengthening to four weeks.

In general, orders are more diversified. Tank and boiler specifications are freer, jobbers are buying on a larger scale and there is some modest pickup in shipyard requirements. Also, railroad car needs are a little better, while structural fabricators are ordering more actively than had been anticipated for this season. Export inquiry is gaining.

More business is coming to eastern mills from consumers in other areas where line pipe requirements are being stepped up appreciably. Also, the lengthening of mill deliveries is prompting more local consumer covering. Actually, some buyers have been forced to fill their needs from jobbers' stocks.

The slight improvement in plate demand noted in New England includes a pickup in large diameter welded steel pipe, high tensile steel for cars and miscellaneous requirements for small underground storage tanks.

Orders for plates in the Midwest continue to expand only modestly.

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but there is a hint of possible supply tightness by midyear.

Sun Shipbuilding & Dry Dock Co., Chester, Pa., is specifying against orders for 21,900 tons of hull steel for three tankers. Of this, 17,400 tons are plates, the remainder largely shapes.

Tubular Goods . . .

Tubular Goods Prices, Page 144

Demand for pipe has been gaining from week-to-week since beginning of the year. Right now the pace of buying appears to be quickening, being reflected in growing order backlogs and the resumption of operations at idle pipe mills.

Last week Republic Steel Corp. reopened its Gadsden, Ala., mill for production of large diameter pipe. The week preceding, National Tube Division, U. S. Steel Corp., reactivated its electricweld mill at McKeesport, Pa.

The rise in volume is ascribed to better consumption and a disposition to build inventories. In general, requirements for building are running ahead of expectations.

New England distributors' stocks are low and they have to scurry around at times to fill orders beyond routine size. Secondary prices in the area are soft, being off 10 points from list generally.

Cast iron pipe requirements are expanding seasonally. Several sizable projects are up for bids in the Pacific Northwest, including some Alaskan jobs.

Steel Bars . . .

Bar Prices, Page 140

Although alloy bar demand lags, there is further definite improvement in carbon bar requirements, both hot-rolled and cold-drawn.

Eastern consumers of hot bars consider themselves lucky if they can get anything under four weeks delivery and they are beginning to realize they had better count on at least five weeks shipment, especially on the smaller sizes.

Tightening supply is causing buyers to show more interest in inventories. This situation could "snowball," though it is still a bit early for that. In fact, New England users are reluctant to place forward orders except where outstanding contracts for end use are extended.

The largest producer of bars in the Pittsburgh district says demand for hot-rolled has risen considerably above December-January levels. The increase in volume comes from diversified consumers, but only slight defense pickup is noted.

Forge shop requirements are up in

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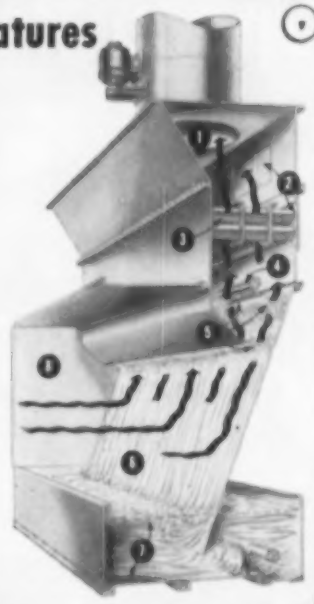

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Water wash spray booths have many advantages over standard dry-type booths, but until now booths of this kind have been too costly for many spray painting applications. Binks new Style D Water Wash Spray Booth is engineered to change all this. It is a simple, mass-produced booth that meets fire and health requirements. It is composed of strong standardized panels and parts which can be assembled quickly and easily. This new booth incorporates many of the time-tested features of the well-known Binks heavy duty Style DUC water wash booth. Several standard widths and heights are available direct from stock. And the cost is low! If you do spray finishing in your shop, Binks Style D Booth ushers in so many advantages and economies you can hardly afford to be without it.

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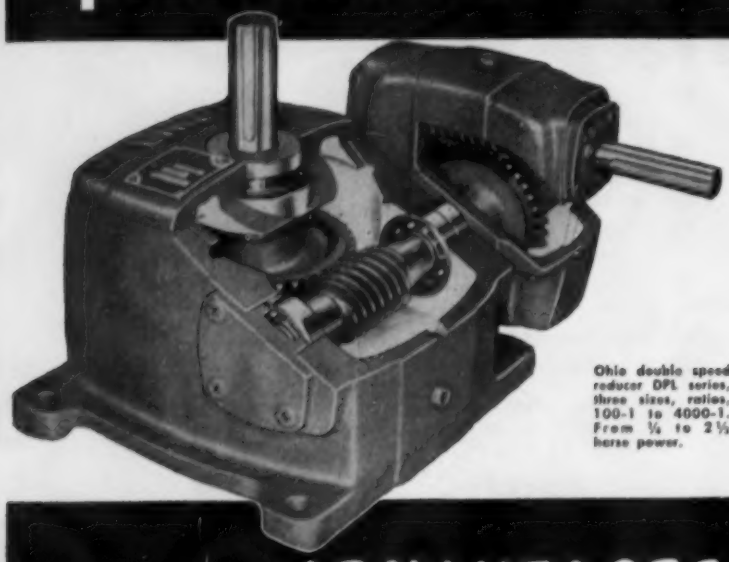

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New England; so is demand on screw machine account, with consumers generally placing orders for immediate needs.

Tool Steel . . .

Tool Steel Prices, Page 144

Orders for late March delivery of tool steel are still being accepted by producers. Demand volume, however, has increased steadily since late in the fourth quarter of last year. A general across-the-board pickup in users' requirements is in evidence. Much of the increase is in orders from suppliers to the automotive industry.

Tin Plate . . .

Tin Plate Prices, Page 142

Shipments of metal cans last year amounted to 4,143,329 tons, compared with 4,802,254 in 1953. December movement of 283,386 tons was 3 per cent above that in November and was substantially ahead of that in the corresponding month of 1953 when 192,403 tons were shipped.

Cans for fruits and vegetables, including juices, were off slightly from the year before — 1,342,488 tons against 1,386,095. But this deficit was more than made up by gains in other categories, such as beer cans, where volume totaled 646,518 tons, compared with 615,702 the year preceding.

Structural Shapes . . .

Structural Shape Prices, Page 140

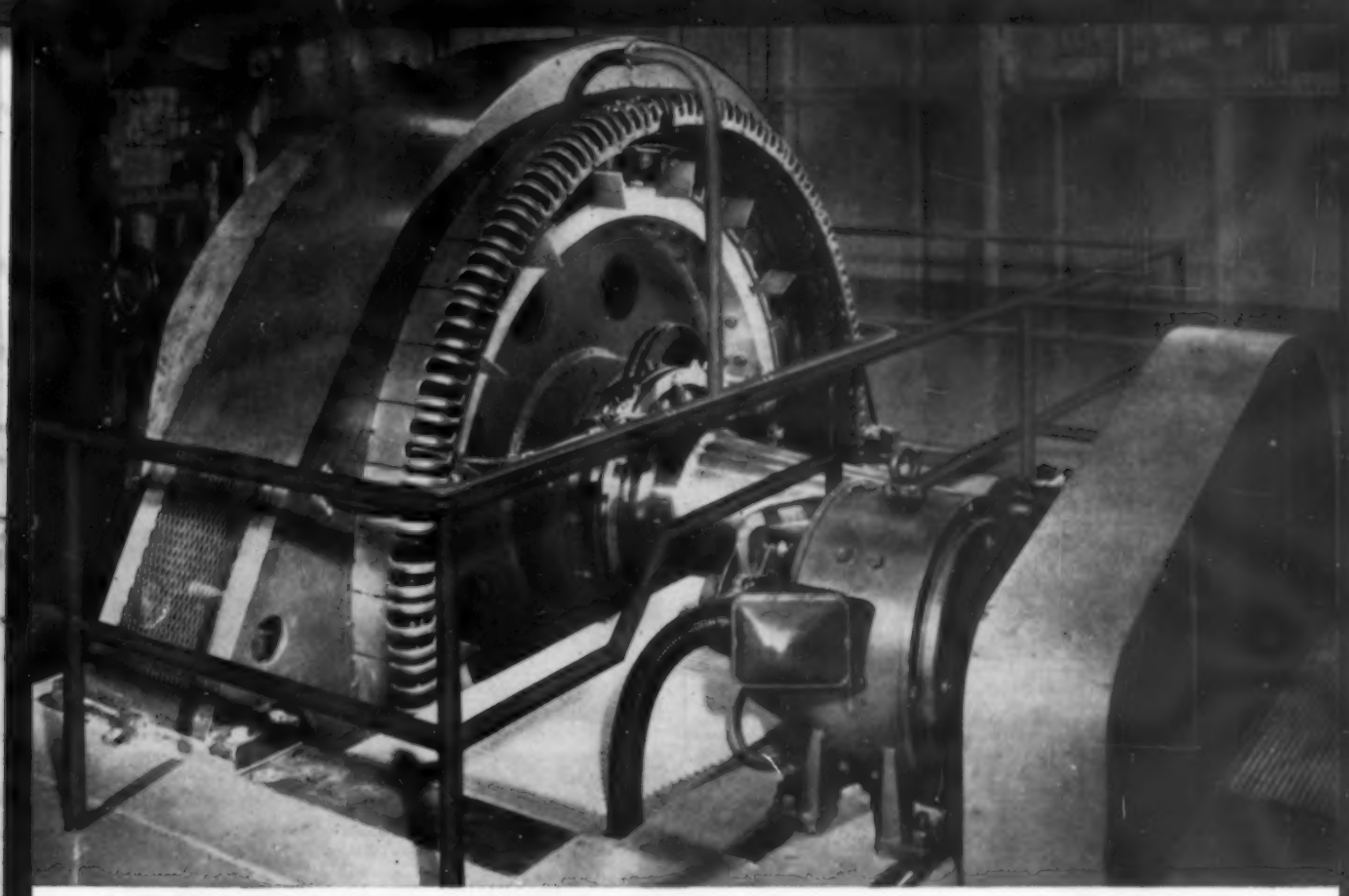
Structural steel demand this year will be as good, if not better, than in 1954, according to Earle D. Grover, president, American Institute of Steel Construction. Of some 24 institute directors, only one dissented from this view at a recent meeting. Also, the general consensus was that structurals are regaining ground lost to concrete during the days of extreme steel shortage.

Mr. Grover, who heads Apex Steel Corp. Ltd., Los Angeles, describes structural activity in that area as "astounding." He says plates are more scarce than shapes, with West Coast fabricators reaching to the Atlantic seaboard for supplies.

Although structural orders momentarily are spotty, inquiry has expanded steadily since start of the year. Public works, notably highway construction, still dominate. But there are office buildings, apartments and other commercial and industrial structures projected to provide market diversity.

Fabricated structural steel contracts are substantially heavier in

(*Please turn to page* 156)



Elliott gets spider rim forgings FAST from STANDARD STEEL WORKS

Fast service on key forgings is mighty important to the Elliott Company. That's one of the big reasons why they have been depending on Standard Steel for years to supply spider rim forgings for their synchronous generators.

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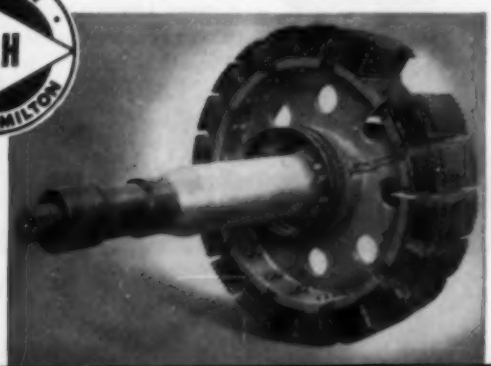
For more information about SSW's ability to produce forgings and castings of unusual sizes and shapes (such as weldless rings up to 144" O.D.) please write Department 8846:



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Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si), Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.). Base price per net ton $190, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, Philo, O.; Sheffield, Ala.; Portland, Oreg., and Tacoma, Wash. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 29.95c per lb of contained Mn, carload packed 30.7c, ton lots 31.8c, less ton 33c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max. 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carloads, 30c; 2000 lb to min carloads, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 11.00c per lb of alloy, carload packed 11.75c, ton lots 12.65c, less ton 13.65c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-42%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.ob. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload lump, bulk, C 0.025% max. (Simplex 34.50c per lb contained Cr, 0.03% C 34.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. S M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, S M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract carload, lump, 4" x down and 2" x down, bulk, 24.75c per lb of contained chromium plus 12c per pound of contained silicon; 1" x down, bulk 24.90c per pound of contained chromium plus 12.2c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe). Contract, 1" x D; packed, max 0.50%, carload $1.16, ton lots $1.18; less ton $1.20. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 9c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth. Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 50-55%, Si 2-3.5% max, C 0.5-1% max). $3.10. **Primes and High Speed Grades** (V 50-55%, Si 1.50% max C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12c per lb of contained Si, carload packed 13.6c, ton lot 15.05c, less ton 16.7c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per pound contained silicon; carload packed 14.85c; ton lots, 16.05c; less ton, 17.4c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.4c per lb of contained Si, carload packed 15.7c, ton lot 16.85c, less ton 18.1c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 17.25c per lb of contained Si, carload packed 18.45c, ton lot 19.4c, less ton 20.45c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe). C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max. 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 25.25c per lb of alloy, ton lot 26c, less ton 27.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min M) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) Contract, lump, carloads 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-15% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.05c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 11.85c per lb of briquet, c.l. packaged 12.85c, ton lot 13.65c, less ton 14.55c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.45c per lb of briquet, c.l packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.55c per lb of briquet. Packed c.l. 7.55c, ton lot 8.35c, less ton 9.25c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.7c. Packaged c.l. 7.7c, ton lot 8.5c, less ton 9.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $12 per lb of contained Cb, less ton $12.05. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $6.25 per lb of contained Cb plus Ta, deld.; less ton lots $6.30.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 2-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%), C.l. packed, 17.50c per lb of alloy, ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-S Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 16.6c per lb of alloy; ton lots 18.10c; less ton lots 19.35c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 15.50c. Packed c.l. 16.50c, 2000 lb to c.l. 16.75c, less than 2000 lb 17.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Sigio, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.46 in all sizes except powdered which is $1.57; Washington, Pa., furnace, any quantity, $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.25 in cans; in bags, $1.24, f.o.b. Langeloth, Pa.; Washington Pa., $1.24.

Ores

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-68%	20.00
N. African hematite (spot)	nom. 20.00-22.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good comercial quality	$25.00-$26.00
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, 90c-92c per long ton unit c.i.f. U. S. ports, duty for buyer's account, 46-47%, 86c.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $40.00-$42.00
48% 3:1	42.00-44.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	31.00-32.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

50-60%	*$3.25-$3.80*
65%	*4.15-4.25*

Vanadium Ore

Cents per lb, V_2O_5 content, deld. mills	
Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Pueblo, Colo., $94; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $114; Salina, Pa., $119; Niles, O., $125; Los Angeles, Pittsburg, Calif., $137.20.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $120; Warren, Niles, O., Hays, Pa., $125; Morrisville, Pa., $123.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $130; Cutler, Utah, $121.55; Los Angeles, $127.65.

Super Duty: Hays, Sproul, Pa., Warren, Windham, O., Athens, Tex., $137; Morrisville, Pa., Niles, O., $140; Joliet, Ill., $143.

Semisilica Brick (per 1000)

Clearfield, Pa., $130; Woodbridge, N. J., $114.

Insulating Fire Brick (per 1000)

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick (per 1000)

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Mo., $77.50; Wellsville, O., $81.50; Clearfield, Pa., Portsmouth, O., $87; Peria, Ark., $109; Los Angeles $110.25; Pittsburg, Calif., $111.30.

High-Alumina Brick (per 1000)

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $181; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Clearfield, Pa., $225; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $260; Danville, Ill., $258; Clearfield, Pa., $267.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $147; Clearfield, Pa., $148.50; St. Louis, $159.30; Athens, Tex., $155.

Nozzles (per 1000)

Reesdale, Pa., $234.70; Johnstown, Pa., $240.70; Clearfield, Pa., $241.40; St. Louis, $269.45; Athens, Tex., $247.70; Bridgeburg, Pa., $267.50.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $183.50; Clearfield, Pa., $185.50; St. Louis, $195.80; Athens, Tex., $191.80.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Nario, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $15.10; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite (per net ton)

Domestic, dead-burned bulk, ¾-in. grains with fines: Luning, Nev., Chewelah, Wash., $38.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.50-$14.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, Ind., ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.00
Swedeland, Pa., ovens	23.00
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, O., deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzol	36.00
Toluol, one deg.	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol, 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $35-$36; 70%, $32-$33; 60%, $28-$29. Imported, net tons, duty paid, metallurgical grade: European, $28-$30; Mexican, $25.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

GRAPHITE

Diam (Inches)	Length	Per 100 lb
2	24	$47.75
2½	30	30.75
3	40	30.00
4	40	28.50
5⅛	40	28.25
6	60	25.50
7	60	25.25
8, 9, 10	60	22.75
12	72	26.00
14	60	22.50
16	72	21.50
17	60	22.00
18	72	21.50
20	72	21.25

CARBON

40	100	$9.50
40, 35	110	9.50
30	84	9.75
24	96	9.60
24	72, 84	9.85
20	90	9.65
20	84	9.85
17	72	9.85
17	60	10.25
14	72	10.25
14, 12, 10	60	11.10
8	60	11.40

(*Concluded from page 152*)

New England due to bridge tonnage for the Massachusetts turnpike.

Some 40,000 tons of fabricated structural steel and heavy equipment will be required for the first three contracts for the St. Lawrence Seaway. They involve construction of a bridge, power house and lock. Most of the work is being estimated.

Prices are generally firm. However, the Phoenixville, Pa. producer recently increased its price on wide flange structural shapes $7 per ton to 4.30c mill. In the Pacific Northwest, outside fabricators are underbidding local shops on many jobs.

Pig Iron . . .

Pig Iron Prices, Page 146

Blast furnace production totaled 5,784,653 net tons in January, according to the American Iron & Steel Institute. This compares with 5,586,513 tons the preceding month and 5,579,513 tons in January, 1954. Blast furnaces operated at 81 per cent of capacity in the month against 80.4 per cent in December and 80.1 in January a year ago.

Of total production in January, 5,729,404 tons were pig iron and 55,249 tons ferromanganese and spiegeleisen. In December iron output amounted to 5,526,720 tons, ferromanganese and spiegeleisen 59,793 tons. In January last year 5,515,689 tons of pig iron and 63,824 tons of ferromanganese and spiegeleisen were produced. Production by districts follows:

BLAST FURNACE PRODUCTION

(Net tons)

	January, 1955		January, 1954	
District	Pig Iron	Ferromanganese & Spiegeleisen	Pig Iron	Ferromanganese & Spiegeleisen
Eastern	1,132,617	25,061	1,214,838	16,972
Pittsburgh-Youngstown, Cleveland-	1,997,045	23,898	1,876,450	19,249
Detroit	678,253	.....	587,926	.....
Chicago	1,220,167	.....	1,151,180	15,448
Southern	425,088	6,250	446,108	12,158
Western	276,234	.....	239,187	.....
Total	5,729,404	55,249	5,515,689	63,824

Trend in pig iron business continues upward. Most sellers believe February volume will be best since last fall.

Foundry business is spotty. In the Midwest, gray iron shops serving the automotive industry are running up to 85 per cent of capacity; others, doing a general jobbing business, are operating as low as 50 per cent.

An encouraging trend in New England is the higher melt by textile mill equipment foundries. Still well under capacity, one shop is doing

twice the work it did in the first quarter of last year. Others have added one to two days per week to schedules.

Blast furnace operators continue to prepare for heavier iron requirements. Inland Steel Co. relighted its No. 3 furnace at Indiana Harbor Works, Indiana Harbor, Ind., making all eight stacks active.

U. S. Steel Corp.'s Tennessee Coal & Iron Division's No. 2 blast furnace at Ensley, Ala., has been returned to service after complete relining and repairs to auxiliary equipment.

Iron Ore . . .

Iron Ore Prices, Page 186

Consumption of Lake Superior iron ore in January totaled 6,619,820 gross tons, reports the Lake Superior Iron Ore Association. This was a slight increase compared with the 6,341,433 tons consumed in December and was off slightly from the 6,995,621 tons consumed in January, 1954.

Stocks of ore at furnaces and on lower lake docks amounted to 37,470,406 tons as of Feb. 1. This compares with 44,017,825 as of Jan. 1 and with 41,974,242 as of Feb. 1, 1954.

Active blast furnaces numbered 167 on Feb. 1, an increase of seven during January and up sharply from the 148 in blast on Feb. 1 a year ago. Only 38 stacks out of a total 205 are inactive. A year ago 56 were idle.

Warehouse . . .

Warehouse Prices, Page 148

Warehouse steel demand shows more life. Bookings are at a higher daily rate than in early February and further increase is in prospect. Each improvement in consumption is mirrored almost immediately in warehouse sales due to low inventories at consuming plants.

All products are sharing in the increase, buying being on a broader base than earlier in the year. Alloys are moving relatively slower than carbon products. Sheets are the most active, but orders for bars and plates are perking up. Structurals are selling well.

Prices are firm except in the Portland, Oreg. area where some sellers continue to offer concessions from standard lists.

Arthur C. Harvey Co., Boston, one of the largest steel distributors in New England, has been acquired by Joseph T. Ryerson & Son Inc., Chicago. The Harvey plant will be occupied by Ryerson. Operations at the latter's Cambridge, Mass., plant will be discontinued.

Steel Shipments by Market Classifications—1954-53

(All grades—Carbon, Alloy and Stainless; Net Tons)

Market Classification	1954 Tonnage	% of 1954 Total	1953 Tonnage	% of 1953 Total
Steel for converting	2,453,703	4.0	3,513,976	4.5
Forgings	832,876	1.4	1,444,539	1.9
Bolts, nuts, etc.	962,572	1.6	1,341,606	1.7
Warehouses	11,999,470	19.8	14,878,559	19.2
Construction	8,634,987	14.2	9,918,203	12.8
Contractors' products	2,969,812	4.9	3,324,218	4.3
Automotive	11,792,989	19.5	14,663,775	18.9
Rail transportation	2,457,297	4.1	4,787,830	6.2
Shipbuilding	501,231	0.8	872,209	1.1
Aircraft	88,848	0.1	161,043	0.2
Oil, gas drilling	585,562	1.0	755,716	1.0
Mining, quarrying	201,624	0.3	324,380	0.4
Agricultural	1,189,199	1.9	1,233,247	1.6
Machinery, tools	3,517,038	5.8	4,328,606	5.6
Electrical machinery	1,739,007	2.9	2,111,879	2.7
Appliances, etc.	1,441,461	2.4	2,045,749	2.7
Other domestic equipment	1,742,090	2.9	2,086,076	2.7
Containers	5,870,618	9.7	6,051,214	7.8
Ordnance, military	964,440	1.6	2,690,888	3.5
Exports	2,533,883	..	2,679,731	..
Unclassified	675,019	1.1	937,853	1.2
Total shipments	63,152,726	..	80,151,893	..

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Scrap . . .

Scrap Prices, Page 160

Pittsburgh — A leading producer bought heavy melting scrap and bundles in the Monongahela valley last week at $2 above local prices. An additional 50 cents per ton was paid for higher delivery charges on shipments to Donora, Pa. These prices confirm the strong demand for scrap here and diminished the spread between local and out-of-district prices.

Philadelphia—A substantial tonnage purchase by the Fairless, Pa., consumer boosted prices on No. 1 heavy melting, No. 1 bundles and No. 1 busheling $1.50 a ton to $39.50 delivered. This buyer paid $1 more for No. 2 heavy melting than it had on a previous purchase, but the market is unchanged at $35. The price was established by a prior sale to another consumer.

Cleveland—The tone of the scrap market here is strong. While prices are unchanged on steelmaking grades, expectations are that pending automotive lists will bring higher prices which will result in a general advance. A major Ohio steelmaker, however, will purchase only limited tonnage for March.

Cast scrap is up about $2 per ton on the various grades, largely reflecting out-of-state demand usually cared for by shipments from the southwest. Tonnage from that area is limited.

Trade interest currently centers on a scheduled meeting in Washington on Mar. 1. Scrap exports again will be considered.

Chicago—Brokers and dealers are concerned because consumption of scrap has not followed the uptrend in steelmaking.

The price structure continues unchanged with buying so limited as to offer no market test.

Boston—Steel scrap prices are edging upward, including those on the lighter grades, turnings and borings, along with No. 2 steel on shipments of under 80,000 lb. For export, prices at dock are unchanged.

New York—Brokers advanced buying prices on several grades. They are paying $33-$34 for No. 1 heavy melting and No. 1 bundles, $30-$31 for No. 2 heavy melting and $24-$25 for No. 2 bundles. They also raised prices sharply on low phos structurals and plates to $35-$36.

Buffalo—Buying by a local consumer and mid-state sources which usually ship here boosted prices on top quality steelmaking scrap 50 cents a ton. No. 1 material hit $32-$33, considered relatively low compared with prices prevailing at Pittsburgh and the Valley.

Cincinnati — The local market is quiet. Brokers expect industrial sales will boost prices. Meanwhile, scrap is moving to out-of-town markets.

Detroit—Scrap iron and steel prices are unchanged here. Practically all local mills have comfortable inventories and are holding up shipments. The outside market, however, is strong.

St. Louis—The scrap market here is stimulated moderately by mill stockpiling where such is possible without boosting prices.

San Francisco — Buying of steel scrap for export continues active at above posted domestic mill prices.

Seattle—The scrap market here is unsettled by reports that negotiations are under way for sale of tonnage to foreign buyers.

Washington—Consumption of ferrous scrap during December totaled 5,078,000 gross tons, largest amount used during any month since October, 1953, reports the Bureau of Mines. The daily consumption rate was virtually the same as November's, while the tonnage used was 3 per cent greater. Pig iron consumption increased 5 per cent.

The total furnace melt (10,057,000 tons) consisted of 50.5 per cent scrap and 49.5 per cent pig iron during the month. This compares with 50.9 and 49.1 per cent, respectively, during November.

Stocks of ferrous scrap held by consumers totaled 6,554,000 gross tons, highest since Sept. 30, 1943.

Steel Import Prices

(Base, per 100 lb, landed, duty paid)

	North Atlantic	South Atlantic	Gulf Coast	West Coast‡
Deformed Bars, Intermediate, ASTM-A-305	$5.50*	$5.50*	$5.50*	$5.78*
Bar Size Angles	5.25*	5.25*	5.25*	5.53*
Structural Angles	5.00*	5.00*	5.00*	5.28*
I-Beams	5.00*	5.00*	5.00*	5.28*
Wide Flange Beams	5.15*	5.15*	5.15*	5.43*
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	28.30	28.30	28.30	29.10
Barbed Wire (†)	6.05	6.05	6.05	6.23
Merchant Bars	5.50*	5.50*	5.50*	5.78*
Hot-Rolled Bands	6.00*	6.00*	6.00*	6.28*
Wire Rods, Thomas Commercial No. 5	5.40*	5.40*	5.40*	5.68*
Wire Rods, O-H Cold Heading Quality No. 5	5.85*	5.85*	5.85*	6.12*
Bright Common Wire Nails	7.15	7.15	7.15	7.45

‡Not including $2.20 per net ton customarily charged in most West Coast ports for wharfage and handling. †Per 63-lb, net, reel. *Nominal.

Sizes O.D.	Wgt/Foot/Lb	Gulf Port	West Coast	Vancouver
Seamless A.P.I. Casing, Grade J-55:				
5½ in.	15.5	$1.47/ft	$1.51/ft	$1.32/ft
7 in.	23	2.10/ft	2.17/ft	1.90/ft
Seamless N-80 Casing:				
5½ in.	17	1.94/ft	2.00/ft	1.75/ft
7 in.	23	2.50/ft	2.70/ft	2.36/ft
Seamless J-55 Tubing:				
2⅜ in.	4.7	0.60/ft	0.65/ft	0.55/ft
2⅞ in.	6.5	0.80/ft	0.83/ft	0.73/ft

Sources of shipment: Western continental European (Schuman Plan) countries.

Rails, Cars . . .

Track Material Prices, Page 143

Domestic freight car orders in January rose to 5087 units from 2685 the preceding month, reports the American Railway Car Institute and the Association of American Railroads. Order backlogs as of Feb. 1 amounted to 18,395 cars, against 15,317 on Jan. 1. Deliveries in January amounted to 2008 units, compared with 2173 in December.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 156

Shipments of oven foundry coke continue at the recent improved pace. Movement to consumers has gained steadily since the opening of the year.

Meanwhile, easiness has developed in the steam coal market. It was reported at Pittsburgh last week that prices on top grade bituminous coal, slack and small sizes, shipped to East Coast public utilities by northern West Virginia mines had been reduced 10 cents per ton to $3.90 at the mine.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2800 tons, courthouse, Madison, Wis., to Bethlehem Steel Co., Bethlehem, Pa.

600 tons, RCA Laboratory, Moorestown, N. J., to Frank M. Weaver & Co. Inc., Lansdale, Pa.

395 tons, five bridges, Massachusetts turnpike, Warren-Brimfield-Sturbridge, Mass., to Elizabeth Iron Works, Elizabeth, N. J.; L. G. DeFelice & Son, Inc., New Haven, Conn., general contractor.

350 tons, I.B.M. Laboratory, Poughkeepsie, N. Y., to Bethlehem Fabricators, Bethlehem, Pa.

300 tons plus, hangar installation, Naknek, Alaska, to Maxwell Steel Co., Ft. Worth, Tex.; Morrison-Knudsen Co., Seattle, general contractor.

(*Please turn to page* 162)

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Feb. 23	$36.67
Feb. 16	36.17
Jan. Avg.	34.95
Feb. 1954	26.91
Feb. 1950	27.52

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	*38.00-39.00*
No. 2 heavy melting	*35.00-36.00*
No. 1 bundles	*38.00-39.00*
No. 2 bundles	*30.00-31.00*
No. 1 busheling	*38.00-39.00*
Machine shop turnings	*20.00-21.00*
Mixed borings, turnings	*20.00-21.00*
Short shovel turnings	*24.00-25.00*
Cast iron borings	*24.00-25.00*
Cut structurals, 5 ft lengths	*41.00-42.00*
Heavy turnings	*34.00-35.00*
Punchings & plate scrap	*42.00-43.00*
Electric furnace bundles	38.00-39.00

Cast Iron Grades

No. 1 cupola	*38.00-39.00*
Charging box cast	33.00-33.00
Heavy breakable cast	33.00-33.00
Unstripped motor blocks	23.00-23.00
No. 1 machinery cast	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt	*38.00-39.00*
Rails, 2-ft and under	*49.00-50.00*
Rails, 18-in. and under	*50.00-51.00*
Rails, random lengths	*45.00-46.00*
Railroad specialties	*44.50-45.50*

Stainless Steel Scrap

18-8 bundles & solids	200.00-210.00
18-8 turnings	95.00-100.00
430 bundles & solids	85.00-90.00
430 turnings	60.00-62.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	33.50-34.50
No. 2 heavy melting	29.50-30.50
No. 1 bundles	33.50-34.50
No. 2 bundles	26.50-27.50
No. 1 busheling	33.50-34.50
Machine shop turnings	17.00-18.00
Mixed borings, turnings	23.00-24.00
Short shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Low phos.	33.50-34.50
Cut structural plate 2 ft and under	38.50-39.50
Alloy free, short shovel turnings	25.50-26.50
Electric furnace bundles	33.50-34.50

Cast Iron Grades

No. 1 cupola	*45.00-46.00*
Charging box cast	*36.00-37.00*
Stove plate	*42.00-43.00*
Heavy breakable cast	*34.00-35.00*
Unstripped motor blocks	*29.00-30.00*
Brake shoes	31.00-32.00
Clean auto cast	*46.00-47.00*
No. 1 wheels	*43.00-44.00*
Burnt cast	*32.00-33.00*
Drop broken machinery	*46.00-47.00*

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
R.R. malleable	44.00-45.00
Rails, 2-ft and under	*50.00-51.00*
Rails, 18-in. and under	*51.00-52.00*
Rails, random lengths	*45.00-46.00*
Cast steel	*38.00-39.00*
Railroad specialties	38.00-39.00
Uncut tires	*40.00-41.00*
Angles, splice bars	*45.00-46.00*
Rails, rerolling	52.00-53.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	190.00-200.00
18-8 turnings	80.00-90.00
430 clips, bundles, solids	80.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	*37.00-38.00*
No. 2 heavy melting	32.00-33.00
No. 1 bundles	36.00-37.00
No. 2 bundles	27.50-28.50
No. 1 busheling	36.00-37.00
Machine shop turnings	18.00-19.00
Short shovel turnings	24.00-25.00
Cast iron borings	24.00-25.00
Low phos.	36.00-37.00
Electric furnace bundles	36.00-37.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00

CHICAGO

No. 1 heavy melting	33.00-35.00
No. 2 heavy melting	31.00-32.00
No. 1 factory bundles	35.00-36.00
No. 1 dealer bundles	33.00-34.00
No. 2 bundles	24.00-25.00
No. 1 busheling	33.00-35.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	18.00-19.00
Short shovel turnings	18.00-19.00
Cast iron borings	18.00-19.00
Cut structurals, 2 ft	36.00-37.00
Punchings & plate scrap	37.00-38.00
Electric furnace bundles	35.00-36.00

Cast Iron Grades

No. 1 cupola	39.00-41.00
Stove plate	34.00-35.00
Unstripped motor blocks	28.00-29.00
Clean auto cast	44.00-45.00
Drop broken machinery	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
R.R. malleable	44.00-45.00
Rails, 2-ft and under	47.00-48.00
Rails, 18-in. and under	48.00-49.00
Angles, splice bars	43.00-44.00
Rails, rerolling	49.00-50.00

Stainless Steel Scrap

18-8 bundles & solids	205.00-210.00
18-8 turnings	95.00-100.00
430 bundles & solids	85.00-90.00
430 turnings	45.00-50.00

Chicago Mercantile Exchange

(Week ended Feb. 23)
No. 1 Heavy Melting

	High	Low	Close
Mar.	....	....	37.00*

Sales (40-ton Units): None.
*Nominal.

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.50
No. 2 heavy melting	22.00
No. 1 bundles	28.50
No. 2 bundles	20.00
No. 1 busheling	27.50
Machine shop turnings	12.00
Mixed borings, turnings	12.00
Short shovel turnings	17.00
Punchings & plate scrap	30.00

Cast Iron Grades

Charging box cast	27.00
No. 1 cupola	34.00
Stove plate	30.00
Heavy breakable	25.00
Unstripped motor blocks	20.00
Clean auto cast	33.00
Malleable	30.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	31.50-32.50
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.50-32.50
No. 2 bundles	22.00-23.00
No. 1 busheling	31.50-32.50
Machine shop turnings	16.00-17.00
Mixed borings, turnings	18.00-19.00
Short shovel turnings	19.00-20.00
Cast iron borings	18.00-19.00
Low phos. 18-in.	36.00-37.00

Cast Iron Grades

No. 1 cupola	39.00
Heavy breakable cast	35.00
Charging box cast	38.00
Drop broken machinery	45.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
Rails, 18-in. and under	47.00-48.00
Rails, random lengths	40.00-41.00

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	*39.50*
No. 2 heavy melting	35.00
No. 1 bundles	*39.50*
No. 2 bundles	29.00
No. 1 busheling	*39.50*
Electric furnace bundles	*41.00*
Machine shop turnings	*22.50*
Mixed borings, turnings	21.00
Short shovel turnings	*25.50**
Structurals & plate	*41.00-42.00*
Heavy turnings	34.00
Couplers, springs, wheels	42.00
Rail crops, 2 ft & under	52.00

Cast Iron Grades

No. 1 cupola	35.00-37.00
Malleable	44.00
Heavy breakable cast	*38.50-39.00*
Drop broken machinery	44.00

* Nominal

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*33.00-34.00*
No. 2 heavy melting	*30.00-31.00*
No. 1 bundles	*33.00-34.00*
No. 2 bundles	*24.00-25.00*
Machine shop turnings	*14.00-15.00*
Mixed borings, short turnings	*15.00-16.00*
Short shovel turnings	*16.00-17.00*
Low phos. (structural & plate)	*35.00-36.00*

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstripped motor blocks	22.00-23.00

Stainless Steel

18-8 sheets, clips, solids	175.00-180.00
18-8 borings, turnings	80.00-85.00
430 sheets, clips, solids	55.00-60.00
410 sheets, clips, solids	45.00-50.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*27.00-28.00*
No. 2 heavy melting	*22.50-23.00*
No. 1 bundles	*27.00-28.00*
No. 2 bundles	*20.00-21.00*
Machine shop turnings	*11.00-12.00*
Mixed borings, turnings	*12.00-13.00*
Machine shop turnings	*11.00-12.00*
Short shovel turnings	*13.50-14.00*
No. 1 cast	30.00-31.00
Mixed cupola cast	28.00-29.00
No. 1 machinery cast	33.00-34.00

BUFFALO

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	27.50-28.50
No. 1 bundles	*32.00-33.00*
No. 2 bundles	25.50-26.50
No. 1 busheling	*32.00-33.00*
Machine shop turnings	19.00-20.00
Short shovel turnings	21.50-22.50
Cast iron borings	20.50-21.50
Low phos.	*35.00-36.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	36.00-37.00
No. 1 machinery	41.00-42.00

Railroad Scrap

Rails, random lengths	35.00-36.00
Rails, 3 ft and under	42.00-43.00
Railroad specialties	36.50-37.50

BIRMINGHAM

No. 1 heavy melting	*30.00-31.00*
No. 2 heavy melting	*27.00-28.00*
No. 1 bundles	*30.00-31.00*
No. 2 bundles	*22.00-23.00*
No. 1 busheling	*26.00-27.00*
Cast iron borings	*15.00-16.00*
Short shovel turnings	16.00-17.00
Machine shop turnings	*15.00-16.00*
Electric furnace bundles	*32.00-33.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	45.00-46.00
Stove plate	42.00-43.00
Bar crops and plate	*35.50-36.50*
Structural plate, 2 ft	*35.50-36.00*
Unstripped motor blocks	35.50-36.50

Railroad Scrap

No. 1 R.R. heavy melt.	*34.00-35.00*
Rails, 18-in. and under	*42.00-43.00*
Rails, rerolling	*43.00-44.00*
Rails, random lengths	*38.00-39.00*
Angles, splice bars	*39.00-40.00*
Stand. steel axles	33.00-34.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	31.00
No. 2 heavy melting	29.00
No. 1 bundles	31.00
No. 2 bundles	24.50
Machine shop turnings	15.00
Short shovel turnings	17.00

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	32.50
Heavy breakable cast	32.50
Unstripped motor blocks	32.50
Brake shoes	*32.00*
Clean auto cast	42.50
Stove plate	36.50

Railroad Scrap

No. 1 R.R. heavy melt.	35.50
Rails, 18-in. and under	46.00
Rails, random lengths	40.00-41.00
Rails, rerolling	46.00
Angles, splice bars	41.00

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	29.00
No. 2 heavy melting	25.00
No. 1 bundles	22.50
No. 2 bundles	20.00
No. 3 bundles	14.00
Machine shop turnings	12.00-14.00
Mixed borings, turnings	12.00-14.00
Short shovel turnings	13.00-14.00
Electric furnace, No. 1	35.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	35.00-40.00
Heavy breakable cast	23.00
Unstripped motor blocks	25.00
No. 1 wheels	21.00
Stove plate (f.o.b. plant)	28.00-29.00
Brake shoes	28.00-29.00

Railroad Scrap
(Delivered consumer plant)

Rails, random lengths	30.00-34.00

LOS ANGELES

No. 1 heavy melting	28.00
No. 2 heavy melting	24.00
No. 1 bundles	27.00
No. 2 bundles	22.00
Machine shop turnings	8.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	42.00-44.00

SAN FRANCISCO

No. 1 heavy melting	24.00
No. 2 heavy melting	20.00
No. 1 bundles	23.00
No. 2 bundles	18.00
No. 1 busheling	24.00
Machine shop turnings	6.00
Mixed borings, turnings	6.00
Short shovel turnings	9.00
Cast iron borings	9.00
Cut structurals	25.00
Heavy turnings	9.00
Punchings & plate scrap	25.00
Electric furnace bundles	19.00

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	30.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	48.00

HAMILTON, ONT.

(Delivered prices)

No. 1 heavy melting	32.00
No. 2 heavy melting	29.00
No. 1 bundles	32.00
No. 2 bundles	26.00
Mixed steel scrap	26.00
Mixed borings, turnings	12.00
Rails, remelting	41.00
Busheling, new factory: Prepared	30.00
Unprepared	26.00
Short steel turnings	12.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.

LOGEMANN Metal Balers

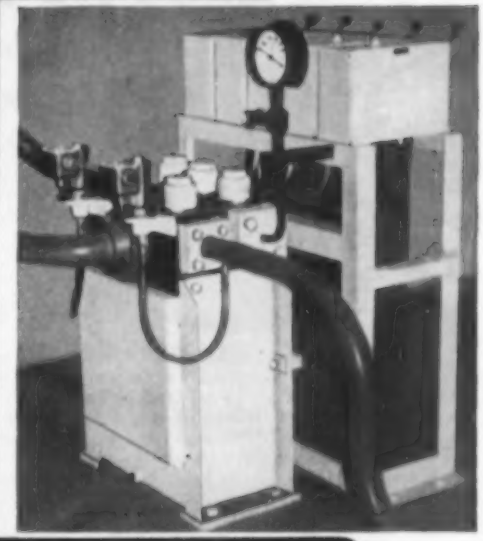
. . . powerful . . . compact . . . capable of high tonnage output!

In the large stamping plants and rolling mills where it is critically important that trim and stamping skeletons are quickly disposed of to avoid interference with production, LOGEMANN metal balers are relied on to keep ahead of production and pack such scrap into high density, self-cohering bricks for re-melting.

Hundreds of installations have established new records for tonnage, minimum maintenance, reliability, over extended periods of uninterrupted operation at high-speed.

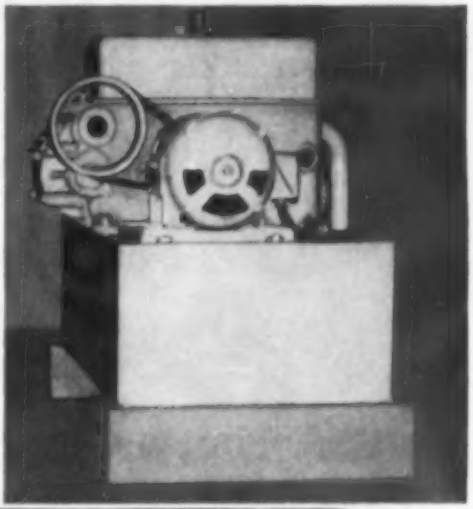
LOGEMANN models are not confined to the large sizes. Many small plants have found it profitable to use smaller sizes embodying the same features of reliability, at minimum operating cost. Interested parties are invited to write for details. Information as to the character of the scrap, tonnage to be handled in a given period of hours, and range of gauges is helpful in determining the proper model.

LOGEMANN



HYDRAULIC VALVES

The illustration shows a close-coupled hydraulic valve, operated by compressed-air cylinders for high-speed distribution of large gallonage of fluid at high pressure. LOGEMANN engineers have designed and built valves for many unusual as well as standard applications, and will welcome inquiries, with an outline of the conditions and requirements.



HYDRAULIC PUMPS

The opposed-cylinder close-coupled double pressure pump shown in the illustration is mounted on an individual tank to conserve floor space under present crowded plant and operating conditions. When requesting details, please indicate the nature of the service, pressure and gallonage requirements, and the fluid to be handled.

LOGEMANN BROTHERS CO.

3126 W. BURLEIGH STREET • MILWAUKEE 10, WISCONSIN

YOUR BEST *Tip* IN CARTS

No. 119
Sterling
HEAVY-DUTY CART

If you're looking for a good tip for wheeling coal, scrap, chips, turnings or similar heavy materials, see these Sterling Heavy Duty Carts. Over and over again the "3-Point Landing" feature of this well-balanced cart will convince you it's the best buy for years of service. Can be furnished with pneumatics, as shown, or steel wheels . . . plain or roller bearings. Write for Catalog.

3 SIZES AVAILABLE:

No. 119	7½ cu. ft.
No. 120	9 cu. ft.
No. 121	11¼ cu. ft.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

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1904-1954
A HALF CENTURY OF PROGRESS

Sterling WHEELBARROWS

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A 7846-14

MicroRold® Stainless Steel "Thinness Control"

provides strip *Quality* in SHEET *Sizes*

Remarkable uniformity of gauge in MicroRold Stainless Sheets up to 36" wide.

The "Thinness Control" used in the manufacture of light gauge MicroRold Stainless Sheets assures you of the *same* dimensional accuracy as in strip stainless. Specified gauge thicknesses may be rolled in sheet sizes with tolerances as low as 3% average (plus or minus) as compared to the A.I.S.I. allowable of plus or minus 10%. This results not only in weight savings but also in fabricating economies.

Regular use of MicroRold Sheet can give you more stainless area per ton or the equivalent area with lesser weight.

MicroRold Stainless Steel Sheets are available up to 36" wide and in gauges from .005 in commercial grades, finishes and temper.

Ask your steel warehouse distributor for MicroRold with "Thinness Control"

Washington Steel *Corporation*
Washington, Pennsylvania

(*Concluded from page 159*)

224 tons, Washington state Humptulips river bridge, to Poole, McGonigle & Dick, Portland, Oreg.; N. Fiorito Co., Seattle, general contractor.

100 tons, state highway bridge, Dennis, Mass., to American Bridge Division, U. S. Steel Corp., Pittsburgh; Campanella & Cardi Construction Co., Hillsgrove, R. I., general contractor.

STRUCTURAL STEEL PENDING

5000 tons or more (estimated), two bridge projects, Fraser river, British Columbia; Gilpin Construction Co. Ltd., Vancouver, B. C., low at $3,477,054, and Vancouver Pile Driving & Contracting Co. low on second schedule at $532,121 to British Columbia Toll Highway & Bridge Authority, Victoria, B. C.

5000 tons, State Mutual Insurance building, Worcester, Mass.

2810 tons, Barnhart Island power plant, near Massena, N. Y., St. Lawrence contract No. 9; bids Apr. 15, New York State Power Authority, New York; contract also includes 9174 tons, erection of gates, trashracks, stoplogs and cranes; 11,000 tons, erection of hydraulic turbines; and 16,000 tons, handling generator parts and electrical equipment.

2100 tons, maintenance hangar and shops, Truax Airfield Base, Madison, Wis.; Corps of Engineers, Milwaukee.

1805 tons, nine bridges, Massachusetts turnpike, Framingham-Natick-Wayland, Mass.; bids Mar. 10; also 60 tons of steel sheet piling.

955 tons, five bridges, Massachusetts turnpike, Sturbridge-Charlton, Mass.; Clark, Farrell & Rodgers' Sons, Memphis, Tenn., general contractors; bridges subcontracted to Monroe-Langstroth Inc., Norwood, Mass.

790 tons, Grass river bridge and approaches, near Massena, N. Y., St. Lawrence contract No. 10; bids Mar. 8, New York State Power Authority, New York.

365 tons, beams, General Stores Supply Office, Navy, Philadelphia.

300 tons, Ladd Air Field, Alaska, shops; bids to U. S. Engineer, Mar. 24.

200 tons, I.B.M. warehouse, Kingston, N. Y.; bids Feb. 28.

200 tons, Galena Air Field, Alaska, hangar; bids to U. S. Engineer, Mar. 24.

121 tons, northeast extension, contract 37-8, state turnpike, Luzerne county, Pa.; bids Mar. 8.

110 tons, 4-span beam bridge, Stony Brook, Suffield, Conn.; bids Feb. 28.

REINFORCING BARS . . .

REINFORCING BARS PLACED

990 tons, multipurpose hangar foundations (11), Loring Airfield Base, Limestone, Me., to Bancroft & Martin Rolling Mills Co., South Portland, Me.; J. W. Bateson Co. Inc., Dallas, Tex., general contractor.

495 tons, five bridges, Massachusetts turnpike, Warren-Brimfield-Sturbridge, Mass., to U. S. Steel Supply Division, U. S. Steel Corp., Boston; L. G. DeFelice & Son, Inc., New Haven, Conn., general contractor.

170 tons, hangar and Army installation, Naknek, Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle; Morrison-Knudsen Co., Seattle, general contractor.

REINFORCING BARS PENDING

18,730 tons, Barnhart Island power plant, near Massena, N. Y., St. Lawrence contract No. 9; bids Apr. 15, New York State Power Authority, New York.

4315 tons, steel sheet piling, General Services Administration, Seattle; also 70 tons of H-piling.

1125 tons, nine bridges, Massachusetts turnpike, Framingham-Natick-Wayland, Mass.; bids Mar. 10, Boston.

800 tons, five bridges, Massachusetts turnpike, Sturbridge-Charlton, Mass.; Clark, Farrell & Rodgers' Sons, Memphis, Tenn., low; bridges subcontracted to Monroe-Langstroth Inc., Norwood, Mass.

500 tons (estimated), Oregon state highway projects; concrete bridges in Jackson, Wallowa, Benton, Klamath, Washington and Multnomah counties; bids to Portland, Oreg., Mar. 2 and 3.

250 tons, Greene street bridge, Spokane, Wash.; bids to Olympia, Wash., Mar. 8.

165 tons, Grass river bridge and approaches

near Massena, N. Y., St. Lawrence contract No. 10; also, 4100 linear feet of steel bearing piles; bids Mar. 8, New York State Power Authority, New York.

PLATES . . .

PLATES PLACED

500 tons, estimated, tanks, Air Force storage depot, Norwalk, Calif., to Consolidated Western Steel Division, U. S. Steel Corp., Los Angeles.

285 tons, steel water tower, McLoughlin Heights, Vancouver, Wash., to H. D. Fowler Inc., Seattle.

PLATES PENDING

600 tons, storage tanks, Naknek, Alaska; decision pending until Mar. 1 on proposed revision; general contract to Morrison-Knudsen Co., Seattle.

250 tons, 500,000-gal, elevated water tank, Fort Sill, Okla.; bids Mar. 22, Corps of Engineers, Tulsa, Okla.

200 tons or more, 5000 feet, penstock; Petersburg, Alaska; bids Mar. 15 to James G. Taylor, city clerk.

100 tons plus, 1-million-gal water tank; bids in to Redmond, Oreg., Mar. 2.

100 tons, water tank, First Crest, Wash.;

100 tons, high tensile, Navy, Kearny, N. J.; bids Mar. 7, Washington, D. C.

100 tons plus, two steel storage tanks; bids to H. F. Green, clerk, Puyallup, Wash., Mar. 3.

100 tons, mild steel, Aberdeen Proving Ground, Md., inv. 340.

PIPE . . .

CAST IRON PIPE PLACED

411 tons, 6, 8 and 12 in., for Everett, Wash., to U. S. Pipe & Foundry Co., Seattle.

CAST IRON PIPE PENDING

2300 tons, 4 to 24 in., Water Division, Metropolitan District Commission, Hartford, Conn.; bids Mar. 3.

RAILS, CARS . . .

RAILROAD CARS PLACED

Atchison, Topeka & Santa Fe, 150 refrigerator cars, to its West Wichita, Kans., shops.

Chicago Great Western, 10 seventy-ton covered hopper cars, to Pullman-Standard Car Mfg. Co., Chicago; also 10 caboose cars to International Railway Car Co., Kenton, O.

Chicago & Northwestern, 226 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Illinois Central, 100 seventy-ton covered hopper cars, to Pullman-Standard Car Mfg. Co., Chicago.

Kansas City Southern, 90 seventy-ton covered hopper cars, to Pullman-Standard Car Mfg. Co., Chicago.

Transportation Materiel Command, 46 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

RAILROAD CARS PENDING

New York Central, 200 seventy-ton covered hopper cars, bids asked.

RAILROAD MATERIAL

1000 tons tie plates, unstated overland railroad, to Bethlehem Pacific Coast Steel Corp., Seattle.

WANTED

BEAM PUNCH AND SPACING TABLE MUST BE IN GOOD CONDITION

KLINE IRON & METAL COMPANY
COLUMBIA, SOUTH CAROLINA

WANTED

Heavy Duty Double Housing
Jumbo Type Gray Planer
48" x 48" x 20 ft.
2 Rail and 2 Side Heads
Advise age, condition, price, etc.
Reply Box 219, STEEL
Penton Building Cleveland 13, Ohio

7500 STEEL CARRIER FRAMES
With Wooden Floors
Excellent Condition
20¼" x 30½" x 3⅝"
ACME IRON & METAL COMPANY
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MUlberry 1-4787

CLASSIFIED

Help Wanted

OVERHEAD CRANE SALESMAN WANTED—To cover Ohio and bordering territory. Salary and commission. Reply Box 209, STEEL, Penton Building, Cleveland 13, Ohio.

Accounts Wanted

ADDITIONAL EQUIPMENT LINES for industrial and power plant use wanted by manufacturers' representative for eastern half of Pennsylvania, southern half of New Jersey, and state of Delaware. Reply Box 221, STEEL, Penton Building, Cleveland 13, Ohio.

Positions Wanted

PLANT AND PRODUCTION MANAGER. Engineering Graduate (M.I.T.) indoctrinated in practical operating experience. Proven record of accomplishment in efficient plant supervision, control, and cost reduction coupled with amicable labor relations. Reply Box 134, STEEL, Penton Building, Cleveland 13, Ohio.

MANUFACTURER'S REPRESENTATIVES

Well known manufacturer of foundry equipment needs established equipment-sales-representatives for EASTERN MICHIGAN —MINNEAPOLIS & ST. PAUL—IOWA & SOUTHERN ILLINOIS—SOUTH ATLANTIC STATES. Must be aggressive and have engineering background—to SELL Core and Mold Blowers and allied foundry equipment. In your reply, state experience, products now handled and territory covered.

Reply Box 216, STEEL,
Penton Bldg., Cleveland 13, Ohio.

ASSISTANT ENGINEER

Recent graduate, age 25 to 35, with rolling mill experience to assist Sales Engineer for steel mill division of major East Coast bearing manufacturer. Position involves engineering design and calculations with some customer contact in engineering capacity.

Give full particulars in first letter including salary requirement—

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RAILWAY CARS—ALL TYPES
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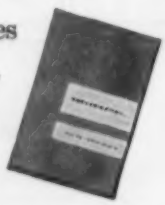

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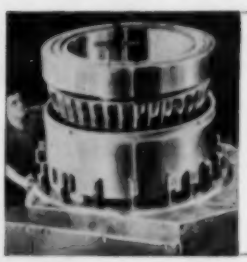

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